PSYCHE

A JOURNAL OF ENTOMOLOGY

ESTABLISHED IN 1874

VOL. XLV MARCH, 1938 No. 1

TABLE OF CONTENTS

Lectotypes of North American Caddis Flies in the Museum of Comparative Zoology. *H. H. Ross* 1

"Shuttling" in *Argiope aurantia*. *F. L. Wells* 62

New Native Neuropteroid Insects. *Nathan Banks* 72

Andreas Vassilievitch Martynov. *F. M. Carpenter* 80

Dytiscus habilus Say and *Loxandrus infimus* Bates in Texas. *P. J. Darlington, Jr.* 84

CAMBRIDGE ENTOMOLOGICAL CLUB

OFFICERS FOR 1937-1938

President	C. A. Frost
Vice-President	J. C. Bequaert
Secretary	V. G. Dethier
Treasurer	Richard Dow
Executive Committee	Thomas Barbour
	F. M. Carpenter
	C. H. Blake

EDITORIAL BOARD OF PSYCHE

EDITOR-IN-CHIEF

C. T. Brues, Harvard University

ASSOCIATE EDITOR

F. M. Carpenter, Harvard University

CONSULTING EDITORS

Nathan Banks, Harvard University.

Thomas Barbour, Harvard University.

Richard Dow, New England Museum of Natural History, Boston, Mass.

A. E. Emerson, University of Chicago.

A. L. Melander, College of the City of New York.

J. G. Needham, Cornell University.

PSYCHE is published quarterly, the issues appearing in March, June, September, and December. Subscription price, per year, payable in advance: $2.00 to Subscribers in the United States; foreign postage, 25 cents extra, Canada 15 cents. Single copies, 65 cents.

Cheques and remittances should be addressed to Treasurer, Cambridge Entomological Club, Biological Laboratories, Harvard University, Cambridge, Mass.

Orders for back volumes, missing numbers, notices of change of address, etc., should be sent to Professor F. M. Carpenter, Biological Laboratories, Harvard University, Cambridge, Mass.

IMPORTANT NOTICE TO CONTRIBUTORS

Manuscripts intended for publication, books intended for review, and other editorial matter, should be addressed to Professor C. T. Brues, Biological Laboratories, Harvard University, Cambridge, Mass.

Authors contributing articles over 8 printed pages in length will be required to bear a part of the extra expense, for additional pages. This expense will be that of typesetting only, which is about $2.00 per page. The actual cost of preparing cuts for all illustrations must be borne by contributors; the expense for full page plates from line drawings is approximately $5.00 each, and for full page half-tones, $7.50 each; smaller sizes in proportion.

AUTHOR'S SEPARATES

Reprints of articles may be secured by authors, if they are ordered before, or at the time proofs are received for corrections. The cost of these will be furnished by the Editor on application.

Printed by the Eliot Press Inc., Jamaica Plain, Mass., U. S. A.

PSYCHE

A Journal of Entomology

Volume XLV

1938

EDITED BY CHARLES T. BRUES

Published by the Cambridge Entomological Club
Biological Laboratories
Harvard University
Cambridge, Mass., U. S. A.

PSYCHE

VOL. XLV MARCH, 1938 No. 1

LECTOTYPES OF NORTH AMERICAN CADDIS FLIES IN THE MUSEUM OF COMPARATIVE ZOOLOGY[1]

By HERBERT H. ROSS

Illinois State Natural History Survey,
Urbana, Illinois

Few species of caddis flies described by Hagen and Banks have had lectotypes designated for them. In a few cases the type series of one species contains representatives of more than one species, a condition which has led to confusion of names due to different interpretations made by different authors. The only way to obviate further repetition of this is to place on a single type basis (by lectotype designations) all those species described from a series of cotypes. This paper sets lectotypes for 229 species, all the lectotypes being in the collection of the Museum of Comparative Zoology.

The method followed in selecting the single type specimens has taken into account very little work done by other authors, since a large number of the species represent segregations seldom recognized by others. Furthermore both Hagen and Banks used a labelling system which left no doubt as to which specimen they considered the real type. Hagen placed his label on only one specimen and marked it with an asterisk if it were a type or plesiotype in the sense of present usage. Other specimens in the series were simply placed in

[1]A grant from the travel fund of the Illinois State Natural History Survey, Urbana, Illinois, made it possible for me to visit the Museum of Comparative Zoology and make these studies. I wish to acknowledge my gratitude and appreciation to the Survey for this grant.

a row after the first labelled specimen; undoubtedly some specimens which are not actually types were put in these series at the same time or subsequently, either by Hagen himself or inadvertantly by others. In selecting lectotypes of Hagen's species the specimen labelled by Hagen has been taken in each case. Lectotypes have been designated for all the species from North America described by Hagen unless they have been previously set in literature, even if only represented in the collection by a single individual. This is done because of the possibility of specimens appearing in other collections which might erroneously be considered as types.

There is a possibility that some specimens designated as lectoallotypes have not been correctly associated with the lectotypes, that is, do not represent the opposite sex of the same species as the lectotypes. In a very high proportion of the North American caddis fly species it is impossible, with our present studies, to separate the females of closely related forms, so that we have to rely to an inordinate extent on collection data as a basis for association.

All the specimens mentioned as "allotype" represent designations made for the first time in this paper.

In the Banks collection the specimens listed without definite collector from the eastern states were taken by Banks himself, except in a few cases.

Banks' species have his own label on the first specimen and simply a "TYPE" label on the others. The first specimen with the label has been taken as the lectotype, a procedure which Mr. Banks has requested and which seems perfectly logical.

In rare cases when these first specimens have been females and the cotype series contained males, an exception to the foregoing procedure has been instituted and a male selected as the lectotype.

No attempt has been made to analyze any of the cotype series except the lectotypes, the remainder automatically becoming paratypes. Such a study would have little significance since the paratypes will have only historic and minor taxonomic interest. Furthermore so many of the specimens have been sent in exchanges, etc., to institutions in widely

scattered countries that it has been impossible for me to gather the necessary information.

The species treated are listed within each family alphabetically according first to genus and then to species. Many of the species have been transferred from genus to genus several times. In attempting to find some method which would be easy to follow and at the same time show the generic placement, I am using the following double entry when a change has been made. If a species is placed in a genus other than the one in which it was described, it is listed both under the genus in which it was originally described and under the genus in which I am placing it. For example, *Hydropsyche sordida* Hagen is now placed in the genus *Cheumatopsyche*. Therefore, it is listed under both *Hydropsyche sordida* in the h's and under *Cheumatopsyche sordida*. Under the former, note is made of the genus in which it is placed.

Professor Nathan Banks, Curator of insects at the Museum of Comparative Zoölogy, and Professor F. M. Carpenter of the Division of Biology, Harvard University, have been of inestimable help during the course of this work in giving information and advice, in placing at my disposal study facilities and equipment, and in the many courtesies accorded me during my visit to the Museum of Comparative Zoology.

Dr. C. O. Mohr, of the Illinois State Natural History Survey, has made most of the drawings for this paper, and I wish to express my gratitude for this.

Family RHYACOPHILIDÆ

Agapetus malleatus Banks, 1914, p. 202, fig. 57.

Lectotype, male.—Los Angeles County, California, San Gabriel Mts., 3000 ft., June 17, 1907, F. Grinnell, Jr. No. 11723. *Lectoallotype, female.*—Same data.

The genitalia of the lectotype are shown in fig. 1.

Baerea? maculata Hagen.—see *Protoptila maculata* (Hagen)

Glossosoma nigrior Banks.—see *Mystrophora nigrior* (Banks)

Glossosoma parvulum Banks, 1904a, p. 108, fig. 13.

Lectotype, male.—Pecos, New Mexico, August 10, at

light. No. 11748. *Lectoallotype, female.*—Same data, but August 13.

The genitalia of a homotype are shown in fig. 2.

Mystrophora lividum (Hagen), 1861, p. 295 (*Tinodes*).

Lectotype, female.—St. Lawrence River, Canada, Osten Sacken. No. 11081.

Milne has determined the male of this species as that illustrated by Betten as *Mystrophora sp.* (1934, pl. 9, figs. 15-17).

Mystrophora nigrior (Banks), 1911, p. 355, fig. 23. (*Glossosoma*)

Lectotype, male.—Black Mountain, North Carolina, north fork Swannanoa River, May. No. 11745. *Lectoallotype, female.*—Same data.

At present there appear to be two valid species in this genus, the two illustrated by Betten (1934) as *americana* and *Mystrophora sp.* No good characters have been discovered as yet which separate the females of the two species, so that the exact status of the names *americana* Banks and *lividum* Hagen is problematic. It seems best at present to consider as *nigrior* the species treated as *americana* by most authors and illustrated by Betten (1934, pl. 8, figs. 4-6 and pl. 9, figs. 1-14), and to consider *americana* as an unidentified species.

Protoptila maculata (Hagen), 1861, p. 296. (*Baerea?*)

Lectotype, male.—St. Lawrence River, Canada, 1859, Sacken. No. 11093. *Lectoallotype, female.*—Same data.

This species has been illustrated by both Banks and Betten (1934).

Rhyacophila acropedes Banks, 1914, p. 201, fig. 39.

Lectotype, male.—Deer creek, Provo Canon, Utah, August 21, Spalding. No. 11741.

This species is closely allied to *coloradensis* Banks, but differs in details of the male genitalia, fig. 6.

Rhyacophila atrata Banks, 1911, p. 351.

Lectotype, male.—Black Mountain, North Carolina, north fork Swannanoa River, May. No. 11739. *Lectoallotype, female.*—Same data.

The genitalia of the type are shown in fig. 3.

Rhyacophila brunnea Banks, 1911, p. 252.

Lectotype, female.—Beulah, New Mexico, July 16. No. 11735.

There is a series of males and females in the M. C. Z. from Cultus Lake, B. C., the females of which appear exactly like the lectotype of *brunnea* in color and external genitalia. A male of this series has been selected as the allotype. It belongs to the *acropedes* group, fig. 4, but is readily distinguished by details of the genitalia.

Allotype, male.—Cultus Lake, British Columbia: May 18, 1933, W. E. Ricker.

Rhyacophila carolina Banks, 1911, p. 353, fig. 31.

Lectotype, male.—Black Mountain, North Carolina, north fork Swannanoa River, May. No. 11727. *Lectoallotype, female.*—Same data.

In addition to those in the original description, illustrations of the genitalia have been given by Betten (1934, pl. 5, figs. 4-7).

Rhyacophila coloradensis Banks, 1905b, p. 10.

Lectotype, male.—Fort Collins, Colorado. No. 11728.

This species is close to *bifila* Banks, but is readily distinguished by details of the genitalia, fig. 5.

Rhyacophila fairchildi Banks, 1930a, p. 130, figs. 4, 7.

Lectotype, male.—Baddeck, Cape Breton Island, Nova Scotia, September 4, 1928. No. 16237. *Lectoallotype, female.*—Same data.

The genitalia of the lectotype agree perfectly with the illustrations of *glaberrima* Ulmer and with the genitalia of the type of *andrea* Betten. There seems little doubt, therefore, that both *fairchildi* and *andrea* are synonyms of Ulmer's species, originally described from Georgia.

Rhyacophila formosa Banks, 1911, p. 353.

Lectotype, female.—Delaware Water Gap, New Jersey. No. 11078.

To date no male has been associated with this form, drawings of which are given by Milne (1936).

Rhyacophila grandis Banks, 1911, p. 350, fig. 27.

Lectotype, male.—Bon Accord, British Columbia, June 14. No. 11737. *Lectoallotype, female.*—Same data, but June 19.

The genitalia of the lectotype are well exposed without clearing, including the apex of the side tubes on the ædeagus. They are identical with those of the homotype illustrated in fig. 8.

Rhyacophila hyalinata Banks, 1905b, p. 10.

Lectotype, male.—South West Colorado, July 23, 1899. No. 11738.

The genitalia of the lectotype have been cleared and compared critically with those of the specimen illustrated in fig. 7.

Rhyacophila luctuosa Banks, 1911, p. 351, fig. 24.

Lectotype, male.—Woodworth Lake, Fulton County, New York, June 23, 1910, Alexander. No. 11740. *Lectoallotype, female.*—Same data.

The male genitalia are shown in fig. 9. The species is listed as a synonym of *invaria* Walker by Banks (1930b).

Rhyacophila minora Banks, 1924, p. 444, fig. 37.

Lectotype, male.—White Mountains, New Hampshire, Morrison. No. 14857. *Lectoallotype, female.*—Same data.

This species was described and illustrated by Betten (1934, p. 134, pl. 7, figs. 10, 11) as *Rhyacophila* sp. 1.

Rhyacophila nevadensis Banks, 1924, p. 443, fig. 53.

Lectotype, male.—Reno, Nevada, Morrison, 1878. No. 14855. *Lectoallotype, female.*—Same data.

Rhyacophila nigrita Banks, 1907a, p. 132, fig. 16.

Lectotype, female.—Black Mountain, North Carolina, June. No. 11742.

The male of this species has been figured in considerable detail by Betten (1934, pl. 7, figs. 1-5). The allotype will have to be designated from one of his specimens.

Rhyacophila rotunda Banks, 1924, p. 443, fig. 33.

Lectotype, male.—Reno, Nevada, 1878, Morrison. No. 14856. *Lectoallotype, female.*—Same data.

Rhyacophila torva Hagen, 1861, p. 296.

Lectotype, male.—Washington, D. C., Sacken. No. 11078.

The genitalia of this species have been illustrated by Banks (1907a, p. 132, fig. 7) and Betten (1934, pl. 7, figs. 6-9).

Tinodes lividum Hagen.—see *Mystrophora lividum* (Hagen)

Family PHILOPOTAMIDÆ

Chimarrha aterrima Hagen, 1861, p. 297.

Lectotype, male.—Mus. Berol. Penn. No. 11098.

The male genitalia have been illustrated by Betten (1934, pl. 16, figs. 6-9).

Chimarrha femoralis (Banks), 1911, p. 358. (*Wormaldia*).

Lectotype, male.—Sacandaga River, Sport Island, New York, June 27, 1910. No. 11520.

This species is a synonym of *socia* Hagen. Betten has figured the genitalia under the latter name (1934, pl. 16, fig. 13).

Chimarrha plutonis (Banks), 1911, p. 358, fig. 34. (*Wormaldia*).

Lectotype, male.—Delaware Water Gap. No. 11519.

The male genitalia of this species have been illustrated by Betten under the name *lucia* Betten (1934, pl. 16, figs. 10-12).

Chimarrha texana Banks, 1920, p. 360.

Lectotype, female.—San Antonio, Texas, August, Snow. No. 10914.

To date no reliable characters have been found for separating the females of this genus, so that for the present this species must be considered of doubtful identity.

Dolophiliella gabriella Banks.—see *Dolophilus gabriella* (Banks).

Dolophilus breviatus Banks, 1914, p. 254, fig. 61.

Lectotype, male.—Ithaca, New York, in Coy Glen, August. No. 11518.

The male genitalia of this type are broader than those of *moestus*, but the study of additional specimens indicates that this difference may be only individual variation.

Dolophilus gabriella (Banks), 1930b, p. 230, fig. 14. (*Dolophiliella*).

Lectotype, male.—San Gabriel Mountains, California, June 29. No. 16326.

The most distinctive feature of this species is the more or

less spatulate process of the eighth sternite.

Dolophilus major Banks, 1914, p. 254, fig. 66.

Lectotype, male.—Black Mountain, North Carolina, May. No. 11517.

This is the largest eastern species in the family.

Philopotamus aequalis Banks, 1924, p. 450, fig. 48.

Lectotype, male.—Tolland, Colorado, Dodds. No. 14853. *Lectoallotype, female.*—Same data.

This western species is readily distinguished by its dark color and the male genitalia.

Philopotamus americanus Banks, 1895, p. 316.

Lectotype, male.—New York. No. 11512.

Both Banks and Betten have given illustrations showing a difference between this species and *distinctus* Walker. While these differences do occur, I have found all intergradations between them in a study of specimens from Michigan, New York, North Carolina and Maryland. All collections which I have seen containing specimens of both sexes are alike in having the females with minute, vestigial wings. This evidence indicates that only one species is involved in this material.

Wormaldia femoralis Banks.—see *Chimarrha femoralis* (Banks).

Wormaldia plutonis Banks.—see *Chimarrha plutonis* (Banks).

Family HYDROPTILIDÆ

Agraylea fraterna Banks, 1907b, p. 164.

Lectotype, male.—Falls Church, Virginia, May 1. No. 11591.

This species is a synonym of *multipunctata* Curtis.

Allotrichia flavida Banks, 1907b, p. 164.

Lectotype, female.—Fort Collins, Colorado, June 9. No. 11593.

No males have yet been associated with this form, so that its exact placement cannot be given.

Allotrichia maculata Banks.—see *Hydroptila maculata* (Banks).

Hydroptila albicornis Hagen, 1861, p. 275.

Lectotype, male.—St. Lawrence River, Canada, Osten Sacken. No. 11105.

This species is easily identified by the ædeagus and claspers, fig. 10. Hagen says the type is a female, but he was evidently misled by the retracted condition of the genitalia.

Hydroptila maculata (Banks), 1904b, p. 116, 3 figs. (*Allotrichia*).

Lectotype, male.—Falls Church, Virginia. No. 11595.

The unique male genitalia, fig. 11, are approached only by *waubesiana* Betten, but many differences separate the two.

Hydroptila tarsalis Hagen.—see *Polytrichia tarsalis* (Hagen).

Hydroptila transversa Banks, 1907b, p. 163.

Lectotype, male.—Washington, D. C., September, at light. No. 11592.

This is a synonym of *maculatus* (Banks).

Orthotrichia americana Banks, 1904b, p. 116, 1 fig.

Lectotype, male.—Washington, D. C., August 13. No. 11598. *Lectoallotype, female.*—Same data.

Illustrations of the cleared male genitalia have been given by Morton, 1905, under the name *brachiata*, which falls as a synonym of *americana* Banks. The species *americana* of authors will take the name *cristata* Morton.

Orthotrichia nigritta Banks, 1907b, p. 163, figs. 1-3.

Lectotype, male.—Austen, Texas, March 3, 1901. No. 11596.

This striking, black species from the southwest is different in many respects from the usual definition of *Orthotrichia* and should be placed in a new genus.

Metrichia new genus

Characteristics.—Ocelli present, close to eye. Tibial spur count, 1-3-4; spur on front tibia apical and small. Wings, fig. 14, narrowing to a pointed apex. Front wings with Sc very stocky, and all the other veins well developed; M1-2 almost fused with Rs; Cu & Cu2 running close to the hind margin of the wing. Hind wing with R1 apparently reduced

to a short "cross-vein", and M1-2 fused for a short distance with Rs.

Genotype.—*Orthotrichia nigritta* Banks (by original designation).

This genus keys out with *Stactobia* but differs from it in the position of Cu & Cu2, the shortening of R1, and in other characters.

Orthotrichia pallida Banks.—see *Oxyethira pallida* (Banks)

Orthotrichia pictipes Banks.—see *Stactobia pictipes* (Banks)

Oxyethira dorsalis Banks, 1904d, p. 216, pl. 2, fig. 5.

Lectotype, female.—Falls Church, Virginia, June 26, No. 11600.

That portion of the type series which corresponds to the original description, especially in having the characteristic white line down the dorsum, contains only female specimens. Until the females and males of more species in the genus have been associated nothing can be done to settle the specific identity of this species.

Oxyethira pallida (Banks), 1904d, p. 215, pl. 2, figs. 2, 7.

Lectotype, male.—Washington, D. C. No. 11599. *Lectoallotype, female.*—Same data.

This species is the same as *viminalis* Morton, which now becomes a synonym of *pallida*.

Polytrichia tarsalis (Hagen), 1861, p. 275. (*Hydroptila*)

Lectotype, male.—St. Lawrence River, Canada, Osten Sacken. No. 11104.

This species has been illustrated by Betten (1934, pl. 12, figs. 11-14) under the name *confusa* Morton. Morton's species is not this one, but according to original figures belongs to another section of the genus.

Stactobia pictipes (Banks), 1911, p. 359.

Lectotype, male.—Johnstown, New York, June 28, Hale's Creek. No. 11597. *Lectoallotype, female.*—Same data.

The spur of the front tibiae put this species in the heterogeneous *Stactobia*. The male genitalia are illustrated in fig. 12. They are strikingly different from any other Nearctic species.

Family POLYCENTROPODIDÆ

Cernotina pallida (Banks), 1904d, p. 214. (*Cyrnus*)

Lectotype, male.—High Island, Maryland, June 17. No. 11539.

This interesting species belongs in the subfamily Psychomyiinæ. The male genitalia are very distinctive, fig. 18. The only females in the M. C. Z. under this name do not belong to this species, so that as yet an allotype cannot be designated.

Cyrnus fraternus Banks.—see *Nyctiophylax fraternus* (Banks)

Cyrnus pallidus Banks.—see *Cernotina pallida* (Banks)

Plectrocnemia albipuncta Banks.—see *Polycentropus albipunctus* (Banks)

Plectrocnemia aureola Banks, 1930a, p. 130, figs. 2, 3, 5.

Lectotype, male.—Baddeck, Cape Breton Island, Nova Scotia, July 20, 1928. No. 16323. *Lectoallotype, female.*—Same data.

Illustrations of the male genitalia are given in fig. 13.

Plectocnemia cinerea (Hagen), 1861, p. 293. (*Polycentropus*)

Lectotype, male.—St. Lawrence River, Canada, 1859, Osten Sacken. No. 11039. *Lectoallotype, female.*—Same data.

The genitalia of this species have been illustrated by Betten (1934, pl. 24, figs. 1-8) under the specific name *canadensis* Banks.

Plectrocnemia flavicornis (Banks), 1907b, p. 162, fig. 1. (*Holocentropus*)

Lectotype, male.—Washington, D. C. No. 11526.

This is a synonym of *cinerea* (Hagen).

Plectrocnemia pallescens Banks, 1930b, p. 231, fig. 3.

Lectotype, male.—Put-in-Bay, Ohio, July 3, 1924, on Middle Bass Island, G. Townsend. No. 16322. *Lectoallotype, female.*—Same data, but July 6, 1926.

The genitalia of this specimen appear identical with those of *cinerea* (Hagen), but the color is lighter. It is my belief that the specimen is slightly teneral. In several species

of caddis flies I have taken large collections every specimen of which was uniformly teneral.

Holocentropus flavicornis Banks.—see *Plectrocnemia flavicornis* (Banks)

Holocentropus interruptus Banks, 1914, p. 257, fig. 71.

Lectotype, male.—Hampton, New Hampshire, June 15, 1908. No. 11543.

This species was illustrated by Betten (1934, pl. 24, fig. 9). It has line priority over *orotus* Banks.

Holocentropus longus Banks, 1914, p. 258, figs. 65, 68.

Lectotype, female.—Framingham, Massachusetts, June 4, 1904, C. A. Frost. No. 11542.

The size and color of this specimen leaves little doubt but that it is the same as *interruptus,* although sure diagnostic characters have not yet been discovered for the females of this genus.

Holocentropus orotus Banks, 1914, p. 257, fig. 69.

Lectotype, male.—Clear Creek, Colorado. No. 11541. *Lectoallotype, female.*—Chimney Gulch, Boulder, Colorado, Oslar.

This species is a synonym of *interruptus* Banks, which has line priority.

Holocentropus placidus Banks.—see *Phylocentropus placidus* (Banks)

Neureclipsis parvulus Banks, 1907b, p. 163, figs. 2, 3.

Lectotype, male.—High Island, Maryland, June 17. No. 11509.

In addition to the original description, the genitalia have been illustrated by Betten (1934, pl. 22, fig. 8, and pl. 23, fig. 1).

Nyctiophylax fraternus (Banks), 1905b, p. 17. (*Cyrnus*)

Lectotype, female.—Plummer's Island, Maryland, August 28. No. 11538.

A species of doubtful standing, placed as a synonym of *vestitus* by Milne (1935).

Nyctiophylax marginalis Banks, 1930b, p. 231, fig. 15.

Lectotype, male.—Put-in-Bay, Ohio, August 5, 1926, G. Townsend. No. 16325.

The male genitalia of this species are very distinctive, especially the sclerotized point on the mesal side of the clasper. They have been illustrated by Mosely under the name *Cyrnellus zernii* Mosely (1934, p. 142), which becomes a synonym of *marginalis*.

Nyctiophylax mœstus Banks, 1911, p. 359.

Lectotype, male.—Peachland, British Columbia, August 19, 1909, J. B. Wallis. No. 11536.

A synonym of *vestitus* Hagen.

Nyctiophylax vestitus (Hagen), 1861, p. 293. (*Polycentropus*)

Lectotype, female.—Washington, D. C., Osten Sacken. No. 11036.

The color and venation of this specimen associates it indubitably with the concept of this species as used by Banks, Betten and others.

Phylocentropus lucidus (Hagen), 1861, p. 294. (*Polycentropus*)

Lectotype, male.—Trenton Falls, New York, 1858, Osten Sacken. No. 11037.

The genitalia of this species also have been figured by Betten (1934, pl. 23, figs. 9-14).

Phylocentropus placidus (Banks), 1905b, p. 15. (*Holocentropus*)

Lectotype, male.—Washington, D. C., August 25. No. 11540.

The essential features of the genitalia of this species have been illustrated by Betten (1934, pl. 23, figs. 2-18). The species *carolinus* Carpenter has been placed as a synonym erroneously by Milne.

Polycentropus albipunctus (Banks), 1930a, p. 131, figs. 6, 9. (*Plectrocnemia*)

Lectotype, male.—Point Brevis, Cape Breton Island, Nova Scotia, July 10, 1928. No. 16324. *Lectoallotype, female.*—Same data.

The genitalia of the male of this species are shown in fig. 17.

Polycentropus arizonensis Banks, 1905b, p. 16.

Lectotype, male.—Huachua Mts., Arizona, June 21. No.

11546. *Lectoallotype, female.*—Same but July 20, 1903.

The genitalia of this distinctive species are shown in fig. 15.

Polycentropus cinereus Hagen.—see *Plectrocnemia cinerea* (Hagen)

Polycentropus lucidus Hagen.—see *Phylocentropus lucidus* (Hagen)

Polycentropus remotus Banks, 1911, p. 359.

Lectotype, male.—Peachland, British Columbia, August 23, 1909, J. B. Wallis. No. 11549.

The male genitalia are shown in fig. 16.

Polycentropus vestitus Hagen.—see *Nyctiophylax vestitus* (Hagen)

Psychomyia diversa (Banks), 1914, p. 253, fig. 64.

Lectotype, male.—Black Mountain, North Carolina, May, along north fork Swannanoa River. No. 11533. This is close but distinct from *griselda* (Betten).

Psychomyia flavida Hagen.—see *Psychomyiella flavida* (Hagen)

Psychomyia pulchella Banks.—see *Psychomyiella pulchella* (Banks)

Psychomyiella flavida (Hagen), 1861, p. 294. (*Psychomyia*)

Lectotype, female.—St. Lawrence River, Canada, 1859, Osten Sacken. No. 11055.

The structure of the male genitalia, fig. 19, indicates that this species belongs to *Psychomyiella* Martynov, and that *Quissa* Milne, with *flavida* as its genotype, is a synonym of it. The female genitalia are distinctive, allowing certain determination of this type. The species is widely distributed.

Psychomyiella pulchella (Banks), 1899, p. 217.

Lectotype, male.—Colorado, accession no. 2022. No. 11534. A synonym of *flavida* (Hagen).

Family HYDROPSYCHIDÆ

Arctopsyche grandis (Banks), 1900a, p. 258. (*Hydropsyche*)

Lectotype, male.—South West Colorado, July 20, 1899. No. 11514.

The mottled wings and male genitalia, fig. 36, will serve to distinguish this species from other nearctic members of the genus.

Cheumatopsyche analis (Banks), 1903b, p. 243. (*Hydropsyche*)

Lectotype, male.—Riverton, New Jersey, July 16. No. 11532.

The elongate apical segment of the clasper, the V-shaped ridge on the dorsum of the tenth tergite, and the inconspicuous apical lobes on the tenth tergite, fig. 20, distinguish the species from others in the genus. To date I have seen no specimens of this species except the type.

The much used name "*Hydropsychodes analis*" has been applied to at least six different species in the past, and records under this name can not be accepted.

Cheumatopsyche gracilis (Banks), 1899, p. 216. (*Hydropsyche*)

Lectotype, male.—Colorado, accession no. 2022. No. 11497.

The elongate apical segment of the clasper combined with the elongate-trapezoidal apical lobes of the tenth tergite will serve to distinguish this species, fig. 23.

Cheumatopsyche minuscula (Banks), 1907a, p. 130, pl. 8, fig. 5. (*Hydropsyche*)

Lectotype, male.—Plummers Island, Maryland, August 29. No. 11530. *Lectoallotype, female.*—Same data.

The pointed and approximate apical lobes of the tenth tergite, fig. 21, set this species off at once from *sordida* (Hagen), with which it was incorrectly synonymized by Milne.

Cheumatopsyche sordida (Hagen), 1860, p. 285. (*Hydropsyche*)

Lectotype, male.—St. Lawrence River, Canada, 1859, Sacken. No. 11015.

This black species is distinguished by the widely separated apical lobes of the tenth tergite; these lobes have a dorsal, truncate apex, fig. 24.

Cheumatopsyche speciosa (Banks), 1904d, p. 214, pl. 2, fig. 6. (*Hydropsyche*)

Lectotype, male.—Plummers Island, Maryland, August 28. No. 11502. *Lectoallotype, female.*—Same data.

In addition to the three large yellow spots of the front wings, the genitalia are distinctive of the species (Betten, 1934, pl. 20, fig. 14).

Diplectrona modesta Banks, 1908b, p. 266, pl. 19, fig. 13.

Lectotype, male.—Riverside, Massachusetts, June 4, C. W. Johnson. No. 11523. *Lectoallotype, female.*—Same data.

The details of the male genitalia have been illustrated by Betten (1934, pl. 17, figs. 3-7).

Hydropsyche analis Banks.—see *Cheumatopsyche analis* (Banks)

Hydropsyche bifida Banks, 1905b, p. 15, fig. 14.

Lectotype, male.—Colorado, accession no. 2175. No. 11503. *Lectoallotype, female.*—Colorado, accession no. 2135, Fort Collins, June.

The male genitalia of this species, fig. 32, are distinguished by the short, widely separated apical processes of the tenth tergite and the small spur at the end of the lateral processes of the ædeagus. The species is widely distributed across the continent.

Hydropsyche californica Banks, 1898, p. 217.

Lectotype, male.—Tahoma, California, August 28, 1897. No. 11304.

The somewhat moniliform apex of the ædeagus distinguishes this species from others in the *scalaris* group, fig. 26.

Hydropsyche chlorotica Hagen, 1861, p. 290.

Lectotype, male.—St. Lawrence River, Canada, 1859, Sacken. No. 11016.

This specimen is identical in genitalia with the lectotype of *morosa* Hagen recently erected by Banks (1938). Diagnostic features include the flattened spur at the end of the lateral arm of the ædeagus, and the relatively simple apex of the ædeagus, fig. 33.

Hydropsyche cockerelli Banks, 1905b, p. 14.

Lectotype, male.—Pecos, New Mexico, June 26, M. Grabham. No. 11506. *Lectoallotype, female.*—Same, August 14, at light, Cockerell.

The long, curved spur at the end of the lateral process of the ædeagus, combined with the short, upright and notched apical processes of the tenth tergite, set off this species from its close relatives, fig. 34.

Hydropsyche depravata Hagen, 1861, p. 290.

Allotype, male.—Georgia, 1860, Gerhard.

This specimen agrees perfectly in color, habitus and labels with the female type of the species. There is no doubt that it is the same species. The genitalia are quite distinct, fig. 31, and in a large number of points suggest that this species and its close allies form the most primitive stock in the genus.

Hydropsyche divisa Banks.—see *Smicridea divisa* (Banks)

Hydropsyche gracilis Banks.—see *Cheumatopsyche gracilis* (Banks)

Hydropsyche grandis Banks.—see *Arctopsyche grandis* (Banks)

Hydropsyche hageni Banks, 1905b, p. 14, figs. 6, 10, 12.

Lectotype, male.—Travilah, Maryland, July. No. 11996.

The greatly lengthened and flattened apico-lateral plates of the ædeagus set the species off from others of the *scalaris* group easily, fig. 22.

Hydropsyche incommoda Hagen, 1861, p. 290.

Lectotype, male.—Georgia, Winthem. No. 11028.

This species is a member of the *scalaris* group. The structures at the apex of the ædeagus are shown in fig. 29.

Hydropsyche kansensis Banks.—see *Potomyia kansensis* (Banks)

Hydropsyche minuscula Banks.—see *Cheumatopsyche minuscula* (Banks)

Hydropsyche novamexicana Banks, 1904a, p. 110, fig. 12.

Lectotype, male.—Roswell, New Mexico, August 22, Cockerell. No. 11505.

This species is a synonym of *occidentalis* Banks.

Hydropsyche occidentalis Banks, 1900a, p. 258.

Lectotype, male.—Pullman, Washington, August 7, 1898. No. 11500.

This species is closest to *scalaris* and *venularis*, but differs

from both in details of the genitalia, fig. 27.

Hydropsyche oslari Banks, 1905b, p. 13, fig. 2.

Lectotype, male.—South West Colorado, July 23, 1899. No. 11501. *Lectoallotype, female.*—Same, but July 17.

The long, apical segment of the claspers and the short, approximate apical processes of the tenth tergite are diagnostic for this species, fig. 35.

Hydropsyche partita Banks, 1914, p. 252, figs. 58, 59.

Lectotype, male.—Switzers Camp, San Gabriel Mts., California, June. No. 11498.

This is a synonym of *oslari.*

Hydropsyche phalerata Hagen, 1861, p. 287.

Allotype, male.—Great Falls, Virginia, July 27.

The great similarity between the pinned lectotype and this allotype leaves no doubt of the correct association of the two. The upturned apex of the tenth tergite and the slightly enlarged apex of the ædeagus are diagnostic, fig. 25.

Hydropsyche recurvata Banks, 1914, p. 253, fig. 73. (*H. slossonæ* var.)

Lectotype, male.—Go Home Bay, Ontario, Split Rock, June 9, E. M. Walker. No. 11507.

This species is distinguished by the combination of a long, curved spur at the end of the lateral process of the ædeagus and the apex of the ædeagus being developed into a pair of large, lateral lobes. The species *codona* Betten (1934, pl. 18, figs. 10-12) is a synonym of *recurvata.*

Hydropsyche slossonæ Banks, 1905b, p. 14, figs. 4, 7.

Lectotype, male.—Franconia, New Hampshire. No. 11495. *Lectoallotype, female.*—Same data.

In general appearance this species resembles other members of the *"alternans"* group, but is distinguished from all others by the male genitalia, fig. 30. Diagnostic characters include: simple, spine-like spur on end of lateral process of ædeagus, three large pockets of spines within apex of ædeagus, and long, excavated processes of tenth tergite which form an apical horseshoe.

Hydropsyche sordida Hagen.—see *Cheumatopsyche sordida* (Hagen)

Hydropsyche speciosa Banks.—see *Cheumatopsyche speciosa* (Banks)

Hydropsyche venularis Banks, 1914, p. 252, fig. 62.

Lectotype, male.—Washington, D. C., June 22. No. 11508.

A member of the *scalaris* group, characterized by the greatly enlarged head at the apex of the ædeagus, which is half again as deep as the stalk, fig. 28.

Macronema carolina Banks, 1909, p. 342.

Lectotype, male.—Southern Pines, North Carolina, June, 1924, A. H. Manee. No. 11529.

This species, although widely distributed, always occurs south of the range of *zebratum* Hagen.

Macronema flavum Hagen.—see *Potomyia flava* (Hagen)

Macronema zebratum Hagen, 1861, p. 285.

Lectotype, male.—St. Lawrence River, Canada, 1859, O. Sacken. No. 11027. *Lectoallotype, female.*—Same data.

This northern species is larger than *carolina* Banks and has the basal antennal segment more bulbous.

Potomyia flava (Hagen), 1861, p. 285. (*Macronema*)

Lectotype, male.—St. Louis, Missouri, 1859, Sacken. No. 11026.

This species has been illustrated by Betten (1934, pl. 21, figs. 1-3).

Potomyia kansensis (Banks), 1905b, p. 15. (*Hydropsyche*)

Lectotype, female.—Douglas County, Kansas, July, electric light. No. 11499.

This represents the female of *flava* (Hagen), and is a synonym of this name.

Smicridea divisa (Banks), 1903a, p. 244, pl. 4, fig. 12. (*Hydropsyche*)

Lectotype, male.—Salt River, Arizona, April, Oslar. No. 11528. *Lectoallotype, female.*—Same data, but April 10.

This species is a synonym of McLachlan's *fasciatella*. The male genitalia show more relationship to *Potomyia* than to any other genus in the family.

Family ODONTOCERIDÆ

Heteroplectron dissimilis Banks, 1897, p. 30.

Lectotype, female.—Sea Cliff, Long Island, New York, June. No. 11718.

A synonym of *indecisum* (Walker).

Heteroplectron rufa (Hagen), 1861, p. 276. (*Molanna*)

Lectotype, male.—Trenton Falls, New York, 1858, Osten Sacken. No. 10956. *Lectoallotype, female.*—Same data.

This species also is a synonym of *indecisum* (Wlk.)

Molanna rufa Hagen.—see *Heteroplectron rufa* (Hagen)

Nerophilus californicus (Hagen), 1861, p. 272. (*Silo*)

Lectotype, female.—California. No. 10994. *Allotype, male.*—Same data.

The allotype may have been of the original type series. It displays the same distinctive color pattern as the female.

Silo californicus Hagen.—see *Nerophilus californicus* (Hagen)

Family MOLANNIDÆ

Molanna cinerea Hagen, 1861, p. 276.

Lectotype, female.—St. Lawrence River, Canada, 1859, O. Sacken. No. 10957.

Only fragments of head and legs, and a fairly complete set of wings are left.

Molanna flavicornis Banks, 1914, p. 261, fig. 46.

Lectotype, male.—Husavick, Manitoba, July 2, 1916, J. B. Wallis. No. 11590. *Lectoallotype, female.*—Winnepeg, Manitoba, May 31, 1911, J. B. Wallis.

The diagnostic features separating this species from others in the genus have been given by Betten (1934).

Family LEPTOCERIDÆ

Athripsodes albostictus (Hagen), 1861, p. 276. (*Leptocerus*)

Lectotype, female.—America, September, Winthem. No. 10963.

At the present time no satisfactory characters have been found to separate the females of this group of species. For the present, therefore, it will be necessary to consider this species of doubtful identity.

Athripsodes dilutus (Hagen), 1861, p. 277. (*Leptocerus*)

Lectotype, male.—Chicago, Illinois, Osten Sacken. No. 10965.

This species is a very close relative of *annulicornis* (Stephens), but may be readily separated from it on the basis of the ædeagus having two internal, large spines, and the clasper having a pedunculate sclerotized process, fig. 42. *Dilutus* has been incorrectly synonymized with *annulicornis;* it is really distinct and seems to be the only name available for the species.

Athripsodes flavus (Banks), 1904d, p. 212, pl. 2, fig. 4. (*Leptocerus*)

Lectotype, male.—Falls Church, Virginia. No. 11572. *Lectoallotype, female.*—Same data.

The angulate basal process of the claspers illustrated in the original description serves to differentiate this species from its only close ally, *ancylus* (Vorhies).

Athripsodes futilis (Banks), 1914, p. 264, figs. 44, 49. (*Leptocerus*)

Lectotype, male.—Go Home Bay, Ontario, July 11, E. M. Walker. No. 11574. *Lectoallotype, female.*—Same data, but August 12.

The male genitalia of this type agree with those of a male from Europe determined by Hagen as *annulicornis* (Stephens) and answer in detail the illustrations of McLachlan. There seems no doubt but that *futilis* must be considered a synonym of *annulicornis.* The chief diagnostic characters are in the ædeagus, which has only a single, large, internal spine, and the clasper, which has a short, digitate, sclerotized process, fig. 41.

Athripsodes lugens (Hagen), 1861, p. 276. (*Leptocerus*)

Lectotype, male.—St. Lawrence River, Canada, 1859, O. Sacken. No. 10966. *Lectoallotype, female.*—Same data.

This species, also, is a synonym of *annulicornis.*

Athripsodes maculatus (Banks), 1898, p. 214. (*Leptocerus*)

Lectotype, female.—Washington, D. C. No. 11576.

The type matches that of *transversus* (Hagen) so perfectly that there is no doubt that the two are the same species. Both type series were collected at Washington.

Athripsodes transversus (Hagen), 1861, p. 279. (*Leptocerus*)

Lectotype, female.—Washington, D. C., Osten Sacken. No. 10967. *Allotype, male.*—Washington, D. C., June 22.

A large series of this species in the M. C. Z. shows that it is the common one in the vicinity of the type locality, and that the designated allotype is correctly associated with Hagen's type. The male genitalia of the allotype are shown in fig. 40.

Athripsodes variegatus (Hagen), 1861, p. 278. (*Leptocerus*)

Lectotype, male.—Chicago, Illinois, Osten Sacken. No. 10964.

The genitalia of this species have been illustrated by Betten under the name *aspinosus* Betten (1934, pl. 31, figs. 5-10). Both *variegatus* and *aspinosus* are synonyms of *resurgens* (Walker), according to the identification of Banks and Milne.

Leptocella candida (Hagen), 1861, p. 280. (*Setodes*)

Lectotype, male.—Florida, May, 1858, Sacken. No. 10972.

No attempt is made here to determine the status of any species in this genus.

Leptocella coloradensis Banks, 1899, p. 215.

Lectotype, male.—Colorado, accession no. 2059. No. 11582. *Lectoallotype, female.*—Colorado, accession no. 2022.

Leptocella minuta Banks, 1900a, p. 257.

Lectotype, female.—Pullman, Washington, August 9, 1898. No. 11581. *Allotype, male.*—Same data, but August 19.

The allotype bears no type label but is undoubtedly of the type lot.

Leptocella nivea (Hagen), 1861, p. 281. (*Setodes*)

Lectotype, male.—St. Lawrence River, Canada, 1859, Sacken. No. 10969.

Leptocella pavida (Hagen), 1861, p. 282. (*Setodes*)

Lectotype, female.—Washington, [D. C.], O. Sacken. No. 10970.

Leptocella stigmatica Banks, 1914, p. 262, fig. 48.

Lectotype, male.—Jemey Mts., New Mexico, July 20. No. 11583.

Leptocella texana Banks, 1905b, p. 19.
Lectotype, male.—Zavalla County, Nueces River, Texas, April 27, 1910, Hunter & Pratt. No. 11578.

Leptocerus albostictus Hagen.—see *Athripsodes albostictus* (Hagen)

Leptocerus americana (Banks), 1899, p. 215. (*Setodes*)
Lectotype, female.—Washington, D. C. No. 11567. *Lectoallotype, male.*—Same data.
This species was made the basis for a new genus *Ymyia* by Milne. All characters except the genitalia, however, group it with the genotype of *Leptocerus.*

Leptocerus dilutus Hagen.—see *Athripsodes dilutus* (Hagen)

Leptocerus flavus Banks.—see *Athripsodes flavus* (Banks)

Leptocerus futilis Banks.—see *Athripsodes futilis* (Banks)

Leptocerus grandis (Banks), 1907a, p. 128, pl. 8, fig. 4. (*Setodes*)
Lectotype, male.—New Haven, Connecticut, June 23, 1904, H. L. Viereck. No. 11564. *Lectoallotype, female.*—Falls Church, Virginia, June 21.
This species is a synonym of *americana.*

Leptocerus lugens Hagen.—see *Athripsodes lugens* (Hagen)

Leptocerus maculatus Banks.—see *Athripsodes maculatus* (Banks)

Leptocerus transversus Hagen.—see *Athripsodes transversus* (Hagen)

Leptocerus variegatus Hagen.—see *Athripsodes variegatus* (Hagen)

Mystacides canadensis Banks, 1924, p. 448, fig. 47.
Lectotype, male.—Sherbrooke, Canada. No. 14852.
This represents the banded form of *longicornis* (L.). Field observations indicate that the unbanded specimens are simply rubbed, since the bands are formed only by hairs.

Mystacides interjecta Banks, 1914, p. 262, figs. 2, 5. (*Œcetina*)

Lectotype, female.—Go Home Bay, Ontario, August 22, E. M. Walker. No. 11551.

This species is a synonym of *longicornis* (L.).

Œcetina disjuncta Banks.—see *Œcetis disjuncta* (Banks)

Œcetina flavida Banks.—see *Œcetis flavida* (Banks)

Œcetina floridana Banks.—see *Œcetis floridana* (Banks)

Œcetina fumosa Banks.—see *Œcetis fumosa* (Banks)

Œcetina interjecta Banks.—see *Mystacides interjecta* (Banks)

Œcetina parvula Banks.—see *Œcetis parvula* (Banks)

Œcetina persimilis Banks.—see *Œcetis persimilis* (Banks)

Œcetis cinerascens (Hagen), 1861, p. 282. (*Setodes*)

Lectotype, male.—Washington, [D. C.] No. 10971.

This species is illustrated by Betten (1934, pl. 35, figs. 2-7) under the name *resurgens* (Walker).

Œcetis disjuncta (Banks), 1920, p. 351, fig. 100. (*Œcetina*)

Lectotype, male.—Arroyo Seco Canyon, San Gabriel Mts., California, June 17, 1913, F. Grinnell, Jr. No. 10915.

The male genitalia resemble those of *avara* (Banks) very closely.

Œcetis flaveolata (Hagen), 1861, p. 282. (*Setodes*)

Lectotype, female.—Washington, [D. C.,] Osten Sacken. No. 10978.

This is the same species as *inconspicua* (Walker) as determined by Milne.

Œcetis flavida (Banks), 1899, p. 216. (*Œcetina*)

Lectotype, male.—Kissimmee, Florida. No. 11557. *Lectoallotype, female.*—Same data.

This is the same species as *inconspicua* (Walker) as determined by Milne.

Œcetis floridana (Banks), 1899, p. 216. (*Œcetina*)

Lectotype, male.—Biscayne Bay, Florida. No. 11555.

This is the same species as *inconspicua* (Walker) as determined by Milne.

Œcetis fumosa (Banks), 1899, p. 216. (*Œcetina*)
Lectotype, female.—Washington, D. C. No. 11556.
This species is a synonym of *cinerascens* (Hagen).

Œcetis immobilis (Hagen), 1861, p. 283. (*Setodes*)
Lectotype, male.—St. Lawrence River, Canada, 1859. No. 10977.
The peculiar claspers, illustrated by Betten (1934, pl. 34, figs. 4, 5) readily distinguish this species.

Œcetis micans (Hagen), 1861, p. 283. (*Setodes*)
Lectotype, male.—Washington, [D. C.,] O. Sacken. No. 10973. *Lectoallotype, female.*—Same data.
This is a synonym of *inconspicua* (Walker) as determined by Milne.

Œcetis parva (Banks), 1907a, p. 130, pl. 9, figs. 24, 26. (*Setodina*)
Lectotype, male.—Kissimmee, Florida. No. 11562.
The genitalia of this minute leptocerid are illustrated in fig. 39. They are extremely similar to those of *avara* except for the claspers, which shows that *Setodina* must be considered at most a subgenus of *Œcetis*.

Œcetis parvula (Banks), 1899, p. 215. (*Œcetina*)
Lectotype, female.—Washington, D. C. No. 11554.
This is the same as *inconspicua* (Walker) as determined by Milne.

Œcetis persimilis (Banks), 1907a, p. 129. (*Œcetina*)
Lectotype, male.—High Island, Maryland. No. 11552. *Lectoallotype, female.*—Same data, in coitu with lectotype.
The distinctive male genitalia are illustrated by Betten (1934, pl. 34, fig. 12).

Œcetis sagitta (Hagen), 1861c, p. 284. (*Setodes*)
Lectotype, female.—Florida, March, 1858, O. Sacken. No. 10975.
This is the same as *inconspicua* (Walker) as determined by Milne.

Setodes americana Banks.—see *Leptocerus americana* (Banks)

Setodes candida Hagen.—see *Leptocella candida* (Hagen)

Setodes cinerascens Hagen.—see *Œcetis cinerascens* (Hagen)

Setodes flaveolata Hagen.—see *Œcetis flaveolata* (Hagen)

Setodes grandis Banks.—see *Leptocerus grandis* (Banks)

Setodes immobilis Hagen.—see *Œcetis immobilis* (Hagen)

Setodes injusta Hagen.—see *Triænodes injusta* (Hagen)

Setodes micans Hagen.—see *Œcetis micans* (Hagen)

Setodes nivea Hagen.—see *Leptocella nivea* (Hagen)

Setodes pavida Hagen.—see *Leptocella pavida* (Hagen)

Setodes sagitta Hagen.—see *Œcetis sagitta* (Hagen)

Setodina parva Banks.—see *Œcetis parva* (Banks)

Triænodes borealis Banks, 1900a, p. 257.

Lectotype, female.—St. Anthony Park, Minnesota. No. 11586.

Until definite characters are discovered for the lucid separation of the females of this genus, it will be necessary to consider this species of unknown status. Sufficient color antigeny exists in this genus to prevent the matching of males and females of each species on conventional characters alone.

Triænodes dentata Banks, 1914, p. 261, fig. 45.

Lectotype, male.—Johnstown, New York, June 28. No. 11589.

The male genitalia, fig. 38, are distinct in having the tenth tergite divided into a pair of long filaments, and having the lateral arm of the clasper of only medium length.

Triænodes flavescens Banks, 1900a, p. 257.

Lectotype, male.—New Brunswick, New Jersey, October. No. 11588.

The details of the male genitalia have been illustrated under the name *ignita* (Walker) by Betten (1934, pl. 39, figs. 1-3).

Triænodes frontalis Banks, 1907a, p. 127, pl. 9, fig. 11.

Allotype, male.—Ft. Collins, Colorado, June 26, accession no. 2154.

This specimen was probably a part of the type series but did not bear a type label. The male genitalia differ from

those of *grisea* Banks chiefly in the long and whip-like mesal process of the clasper, fig. 37A.

Triænodes grisea Banks, 1899, p. 214.

Lectotype, female.—Colorado, accession no. 2184. No. 11585. *Allotype, male.*—Denver, Colorado, June 27.

This specimen was probably a part of the type series but did not bear a type label. The genitalia resemble those of *frontalis,* but differ in the short mesal processes of the claspers, fig. 37.

Triænodes injusta (Hagen), 1861, p. 283. (*Setodes*)

Lectotype, male.—St. Lawrence River, Canada, 1859, Osten Sacken. No. 10976.

The genitalia of this species have been illustrated by Betten (1934, pl. 39, figs. 4-6).

Family PHRYGANEIDÆ

Agrypnia colorata Hagen, 1873, p. 424.

Lectotype, male.—Saskatchewan, 1860, Kennicott. No. 10734.

The male genitalia were illustrated by Milne (1931, figs. 10-11) under the name *bradorata* Milne.

Agrypnia straminea Hagen, 1873, p. 425.

Lectotype, male.—Saskatchewan, 1860, Kennicott. No. 10735.

The genitalia have been illustrated by Betten (1934, pl. 42, figs. 10-12) under the name *curvata* Banks, which is a synonym of *straminea.*

Neuronia angustipennis Hagen, 1873, p. 400.

Lectotype, male.—House, C[ambridge, Massachusetts?], July 9, 1863. No. 10739.

Neuronia stygipes Hagen, 1873, p. 388.

Lectotype, male.—West Roxbury, Massachusetts, April 26, 1868. No. 10741.

The male genitalia have been illustrated by Betten (1934, pl. 42, figs. 8, 9.

Family LIMNEPHILIDÆ

Acronopsyche pilosa Banks.—see *Neophylax pilosus* (Banks)

Anabolia assimilis Banks.—see *Limnephilus assimilis* (Banks)

Anabolia curta Banks.—see *Limnephilus curtus* (Banks)

Anabolia modesta Hagen.—see *Limnephilus modestus* (Hagen)

Anabolia montana Banks.—see *Limnephilus montanus* (Banks)

Anabolia nigricula Banks.—see *Limnephilus nigricula* (Banks)

Anisogamus costalis (Banks), 1901, p. 286. (*Asynarchus*)
Lectotype, male.—Las Vegas Range, New Mexico, June 28. No. 11676.

The generic placement of this species seems to me somewhat doubtful. The male genitalia, fig. 44, show this species to belong to a residue of forms whose relationships are obscure.

Anisogamus disjunctus Banks, 1914, p. 156, fig. 22.
Lectotype, male.—Bon Accord, British Columbia, May 22. Russell. No. 11673. *Lectoallotype, female.*—Same data, but May 18.

The male genitalia, fig. 43, lead to the same remarks as applied to the preceding.

Anisogamus edwardsi Banks.—see *Drusinus edwardsi* (Banks)

Apatania canadensis Banks.—see *Glyphopsyche canadensis* (Banks)

Apatania pallida Hagen.—see *Apatelia pallida* (Hagen)

Apatania shoshone Banks.—see *Apatelia shoshone* (Banks)

Apatelia incerta (Banks), 1897, p. 28. (*Enoicycla*)
Lectotype, male.—Sea Cliff, New York. No. 11681. *Lectoallotype, female.*—Franconia, New Hampshire.

The male genitalia are illustrated in fig. 47. Milne (1935) considered this the same as *nigra* (Wlk.). There are, however, two different species of *Apatelia* with long, needle-like claspers, and it is very likely *nigra* applies to one and *incerta* to the other.

Apatelia pallida (Hagen), 1861, p. 270. (*Apatania*)

Lectotype, male.—St. Lawrence River, Canada, 1859, O. Sacken. No. 14715.

This is a synonym of *stigmatella* (Zett.).

Apatelia shoshone (Banks), 1924, p. 442, figs. 35, 42. (*Apatania*)

Lectotype, male.—Yellowstone Park, Wyoming, H. S. Smith. No. 14850. *Lectoallotype, female.*—Same data.

The genitalic characters mentioned in the original description will separate this species from its closest ally, *stigmatella* (Zett.).

Apolopsyche pallida Banks.—see *Limnephilus pallidus* (Banks)

Asynarchus centralis Banks, 1900a, p. 253.

Lectotype, male.—Clear Cr., Colorado, September 10, 1899, Oslar. No. 11670.

The male genitalia, fig. 45, are suggestive of some species of *Limnephilus*, but other characters, such as the unusually long maxillary palpi, are quite distinctive. For the present it seems better to regard the generic assignment as open to question.

Asynarchus costalis Banks.—see *Anisogamus costalis* (Banks)

Asynarchus pallidus Banks, 1903b, p. 242.

Lectotype, female.—South Park, Colorado, August 23, 1899, Oslar. No. 11671.

The species represents the opposite sex of *centralis* Bks. and is a synonym of it.

Asynarchus tristis Banks.—see *Dicosmœcus tristis* (Banks)

Chilostigma subborealis Banks.—see *Glyphopsyche subboreale* (Banks)

Clistoronia maculata (Banks), 1904a, p. 107, pl. 1, figs. 2, 4. (*Dicosmoecus*)

Lectotype, male.—Pecos, New Mexico, August 24, at light, Cockerell. No. 11653. *Lectoallotype, female.*—South Arizona, August, 1902, F. B. Snow.

This species is the same as *formosus* (Banks). The male genitalia, fig. 46, show that the genus *Clistoronia* Banks is

closely allied to the *Limnephilus* section of the family, rather than to the *Stenophylax* section.

Colpotaulius medialis Banks.—see *Limnephilus medialis* (Banks)

Colpotaulius minusculus Banks.—see *Limnephilus minusculus* (Banks)

Colpotaulius tarsalis Banks.—see *Limnephilus tarsalis* (Banks)

Dicosmœcus atripes (Hagen), 1875, p. 600. (*Platyphylax*)

Lectotype, male.—Colorado Mts., August 1873, Comporte. No. 10701.

The male genitalia are illustrated in fig. 49. The color of legs is variable (see *D. gilvipes*).

Dicosmœcus gilvipes (Hagen), 1875, p. 601. (*Stenophylax*)

Lectotype, male.—Quesnel Lake, British Columbia, August 27, Crotch. No. 10716.

The genitalia of this type are identical with those of *atripes* (Hagen). The color of the legs, previously used to separate the two, was found to vary over a large series of specimens. *Gilvipes*, therefore, becomes a synonym of *atripes*.

Dicosmœcus maculatus Banks.—see *Clistoronia maculata* (Banks)

Dicosmœcus tristis (Banks), 1900a, p. 254. (*Asynarchus*)

Lectotype, male.—South Park, Colorado, August 17, 1899, Oslar. No. 11634. *Lectoallotype, female.*—Same data, but August 20.

This is a synonym of *unicolor* (Banks). The male genitalia differ considerably from those of *atripes*, fig. 48.

Drusinus calypso (Banks), 1911, p. 350, pl. 13, fig. 25. (*Stenophylax*)

Lectotype, male.—Catskills, New York, June. No. 11672.

This species is identical with *sparsus* (Bks).

Drusinus edwardsi (Banks), 1920, p. 345. (*Anisogamus*)

Lectotype, male.—Marin County, California, H. Edwards. No. 10881. *Lectoallotype, female.*—California.

The genitalia, illustrated in the original description, and general structure place this species in *Drusinus* Betten.

Ecclisomyia maculosa Banks, 1907a, p. 123, pl. 9, fig. 18.

Lectotype, female.—Boulder, Colorado, July 31, 1904, Oslar. No. 11680. *Allotype, male.*—Slate Cr., Summit County, Colorado, August 2, 8, 211 ft. elevation, S. C. Clagg.

The male genitalia, fig. 50, are quite distinctive.

Enoicycla incerta Banks.—see *Apatelia incerta* (Banks)

Enoicycla lepida Hagen.—see *Stenophylax lepidus* (Hagen)

Glyphopsyche bellus (Banks), 1903b, p. 241. (*Glyphotaelius*)

A male in the M. C. Z. identical in external characters with the female type is here designated the allotype. The male genitalia, fig. 51, are quite distinctive.

Allotype, male.—March 23, 1903.

Glyphopsyche bryanti Banks, 1904c, p. 141.

Lectotype, male.—Wellington, British Columbia, Bryant. No. 11640. *Lectoallotype, female.*—Same data.

This lectotype is identical with paratypes of *intercisus* (Wlk.) in the M. C. Z., which species in turn has been synonymized with *irroratus* (Fabricius), fig. 53.

Glyphopsyche canadensis (Banks), 1924, p. 442, fig. 5. (*Apatania*)

Lectotype, male.—Winnipeg, Manitoba, October 1, 1909, J. B. Wallis. No. 14851.

The genitalia, fig. 52, are similar in general conformation to those of other nearctic members of the genus.

Glyphopsyche subboreale (Banks), 1924, p. 441, fig. 32. (*Chilostigma*)

Lectotype, male.—Alaska. No. 14847. *Lectoallotype, female.*—Beaver Mts., Alaska, May 15, 1917, A. B. Twitchell.

The male genitalia are illustrated in fig. 54.

Glyphopsyche taylori (Banks), 1904c, p. 140. (*Halesus*)

Lectotype, female.—Wellington, British Columbia, Bryant. No. 11666.

The extremely striking appearance of this species, the genotype of *Halesochila* Banks, is the chief character separating it from *Glyphopsyche*. Since it agrees so well with this latter genus in structural characters, it seems advisable to reduce *Halesochila* to subgeneric rank.

Glyphotælius bellus Banks.—see *Glyphopsyche bellus* (Banks)

Glyphotælius hostilis Hagen, 1864, p. 814.

Lectotype, male.—Saskatchewan, 1860, Kennicott. No. 10730. *Lectoallotype, female.*—Fort Resolution, Great Slave Lake, Canada, 1862, Kennicott.

This large, distinctive species with the incised wing apex needs no comment.

Goniotaulius coloradensis Banks.—see *Limnephilus coloradensis* (Banks)

Grammataulius praecox Hagen, 1873, p. 451.

Lectotype, male.—Fort Resolution, Great Slave Lake, Canada, 1862, Kennicott. No. 10732.

The species has been synonymized with *interrogationis* Zett.

Halesus amicus Hagen.—see *Platycentropus amicus* (Hagen)

Halesus hostis Hagen.—see *Platycentropus hostis* (Hagen)

Halesus taylori Banks.—see *Glyphopsyche taylori* (Banks)

Halesus mutatus Hagen.—see *Limnephilus mutatus* (Hagen)

Hesperophylax alascensis (Banks), 1908b, p. 265, pl. 19, fig. 14. (*Platyphylax*)

Lectotype, male.—Sitka, Alaska. No. 11647.

This species is very close to and may be the same as *designatus* (Walker).

Hesperophylax consimilis Banks, 1900a, p. 253. (*Limnephilus*)

Lectotype, male.—South Park, Colorado, August 25, 1899, Oslar. No. 11612. *Lectoallotype, female.*—Same data but July 20.

Differentiated by the sharp tenth tergite, fig. 55, this species is close to *magnus* Banks.

Hesperophylax magnus Banks, 1918, p. 20, fig. 9.

Lectotype, male.—Palmerlee, Cochise County, Arizona, Biedermann. No. 10075. *Lectoallotype, female.*—Stockton, Utah, July 22, Spaulding.

This species is quite distinct from the other nearctic species of the genus on the basis of the cercus (see original description). It has been considered a subspecies of *designatus* Wlk. erroneously by Milne (1935).

Hesperophylax occidentalis Banks, 1908b, p. 265, pl. 19, fig. 16. (*Platyphylax*)

Lectotype, male.—Florrisant, Colorado, August 3, 1907, S. A. Rohwer. No. 11646. *Lectoallotype, female.*—Ft. Wingate, New Mexico, August, Wingate.

A close ally but not a synonym of *designatus* (Wlk.).

Homophylax crotchi Banks, 1920, p. 345.

Lectotype, female.—Victoria, British Columbia, July, Crotch. No. 10877.

The striking wing pattern of yellow and dark brown will serve to identify this species.

Homophylax flavipennis Banks, 1900a, p. 255.

Lectotype, male.—South Park, Colorado, August 23, 1899, Oslar. No. 11635. *Lectoallotype, female.*—Same data.

The male genitalia show many points of similarity to those of *Glyphopsyche.*

Leptophylax gracilis Banks, 1900a, p. 252.

Lectotype, female.—St. Anthony's Park, Minnesota. No. 11637.

The male was described by Betten (1934, pl. 44, figs. 2-5). This seems to be one genus of the *Limnephilus* group sufficiently distinct to be recognized. At least, it can be keyed out in both sexes without difficulty.

Limnephilus Leach

Inability to find satisfactory characters for segregating the females into the same groups as the males has led me to consider as only of subgeneric rank such groups as *Anabolia, Anabolina, Colpotaulius, Goniotaulius* and some others.

Limnephilus abbreviatus Banks, 1908b, p. 263, pl. 18, fig. 8.

Lectotype, male.—Tabernash, Colorado, August, E. S. Tucker. No. 11625. *Lectoallotype, female.*—Same data.

The male genitalia are quite distinctive, fig. 71.

Limnephilus aequalis Banks, 1914, p. 150, figs. 14, 31.

Lectotype, male.—Bon Accord, British Columbia, June 7, Russell. No. 11624.

This species is a synonym of *harrimani* Bks., fig. 82.

Limnephilus americanus Banks, 1900a, p. 253.

Lectotype, female.—Idaho, C. V. Piper. No. 11631.

This is considered a synonym of *sublunatus* Prov., fig. 73.

Limnephilus argenteus Banks, 1914, p. 152, fig. 13.

Allotype, male.—Hardisty Island, Great Slave Lake, Canada, June 5, 1924, J. Russell.

The male genitalia, fig. 56, are very different from any described Nearctic species in the genus.

Limnephilus assimilis (Banks), 1908b, p. 262, pl. 19, figs. 9, 10. (*Anabolia*)

Lectotype, male.—Prescott, Arizona. No. 11648. *Lectoallotype, female.*—Same data, June 15, 1902, Oslar.

The slender and branched lateral arms of the ædeagus, fig. 58, distinguish this species from its closest allies.

Limnephilus bifidus Banks, 1908b, p. 263, figs. 11, 13-15.

Lectotype, female.—Pullman, Washington, C. V. Piper. No. 11627.

The type series contains only females.

Limnephilus brevipennis (Banks), 1899, p. 209. (*Stenophylax*)

Lectotype, male.—Colorado, Gillette. No. 11612.

In this species the male genitalia, fig. 77, appear to have the claspers much reduced and the lobes of the tenth tergite again divided.

Limnephilus canadensis Banks, 1908b, p. 264, pl. 18, fig. 4.

Lectotype, female.—Laval County, Canada, June 29. No. 11619.

Until more female characters are worked out for this genus, the identity of this species cannot be determined.

Limnephilus clausus Banks, 1924, p. 440, fig. 56.

Lectotype, male.—Long Lake, Colorado, Cockerell. No. 14844. *Lectoallotype, female.*—Same data.

This species is closely related to *kincaidi* Bks., the chief difference being in the lateral arms at the base of the apical portion of the ædeagus, fig. 64.

Limnephilus cockerelli Banks, 1900b, p. 124.

Lectotype, female.—Top of Range between Sapello and

Pecos Rivers, New Mexico, August 2, 1900, 11,000′ elev., T. D. A. & W. P. Cockerell. No. 11613. *Allotype, male.*—Top Las Vegas Range, New Mexico.

The male genitalia show this species to be a close relative of *moestus* Bks. The chief differences are found in the proportions of the tenth tergite and cerci, and details of the ædeagus, fig. 84.

Limnephilus coloradensis (Banks), 1899, p. 208. (*Goniotaulius*)

Lectotype, male.—Colorado. No. 11621.

The curious ædeagus, fig. 76, and flattened claspers group this species with *kennicotti* Banks, although the two are by no means the same.

Limnephilus concolor Banks, 1899, p. 207.

Lectotype, male.—Tacoma, Washington, September 5, 1897. No. 11611. *Lectoallotype, female.*—Same data.

The abdomen of the lectotype is missing, hence it is impossible at present to give the diagnostic characters for the species.

Limnephilus consimilis Banks.—see *Hesperophylax consimilis* (Banks)

Limnephilus curtus Banks, 1920, p. 345, fig. 57. (*Anabolia*)

Lectotype, male.—Massachusetts. No. 10874. *Lectoallotype, female.*—White Mts., New Hampshire.

This species has been synonymized with *planifrons* Kolenati.

Limnephilus diversus (Banks), 1903a, p. 244, pl. 4, fig. 5. (*Anabolina*)

Lectotype, male.—Prescott, Arizona, Oslar. No. 11649. *Lectoallotype, female.*—Same data.

The cerci, fig. 79, distinguish this species from its closest relative, *productus* Bks.

Limnephilus elongatus Banks, 1920, p. 344, figs. 92, 94, 98, 99.

Lectotype, male.—Fort Resolution, Great Slave Lake, Canada, 1862, Kennicott. No. 10870.

This species is a close relative of *sublunatus* Prov., but is readily distinguished by characters of the male genitalia, fig. 72.

Limnephilus externus Hagen, 1861, p. 257.

Lectotype, female.—North Red River, Canada, 1854, Uhler. No. 10727.

The wing pattern is distinctive for the species. The male genitalia are illustrated in fig. 80.

Limnephilus flavastellus Banks, 1918, p. 20, pl. 1, figs. 16, 17.

Lectotype, male.—Jones Collection. No. 10072. *Lectoallotype, female.*—Wellington, British Columbia, September 23, 1903.

This species is a synonym of *externus* Hagen.

Limnephilus gravidus Hagen, 1861, p. 257.

Lectotype, female.—California. No. 10723. *Allotype, male.*—Santa Cruz, California, May 20, 1905.

The abdomen of the type is partly gone. A male agreeing well with the type and designated allotype has male genitalia, fig. 75, differing from those of *vastus* Hagen chiefly in details of the tenth tergite.

Limnephilus hageni Banks, 1930b, p. 226, figs. 7-9.

Lectotype, male.—Fort Resolution, Great Slave Lake, Canada, 1862, Kennicott, No. 16316. *Lectoallotpe, female.* —Same data.

Belongs to the *sublunata* group, differing from other members as follows, fig. 69: appendages of the genitalia abbreviated, the preanal appendages with a small sclerotization near the apex on the dorsal margin, and the sclerotized part of the lateral arms of the ædeagus stockier.

Limnephilus hyalinus Hagen, 1861, p. 258.

Lectotype, male.—North Red River, Canada, 1858, Uhler. No. 10722.

The male genitalia have been illustrated by Betten under the designation *"Limnephilus sp. 1"* (1934, pl. 46, fig. 5 and pl. 47, fig. 7).

Limnephilus medialis (Banks), 1905b, p. 8, pl. 1, fig. 3. (*Colpotaulius*)

Lectotype, male.—Muskoka, Ontario, July, 1888, E. P. Van Duzee. No. 11656. *Lectoallotype, female.*—Ithaca, New York, electric light.

This species has been synonymized with *consocia* Wlk.

Limnephilus janus new name for

Limnephilus minusculus (Banks), 1924, p. 439, fig. 52. (*Colpotaulius*). Preoccupied by *Limnephilus minusculus* (Banks), 1906, p. 120. (*Stenophylax*).

Lectotype, male.—Tolland, Colorado, Dodds. No. 14842. *Lectoallotype, female.*—Same data.

The male genitalia, fig. 59, are distinctive. I do not believe that this Colorado species is the same as *perpusillus* Walker, as stated by Milne.

Limnephilus modestus (Hagen), 1861, p. 265. (*Anabolia*)

Lectotype, male.—Labrador, 1858, Hugo Christoph. No. 10711.

The differences between the genitalia of this species and *mutatus* (Hagen) are found chiefly in the cerci, fig. 65.

Limnephilus moestus Banks, 1908a, p. 62, pl. 2, figs. 4, 8, 10, 11.

Lectotype, male.—Grand Lake, Newfoundland, July 28, 1906, O. Bryant. No. 11629. *Lectoallotype, female.*—Same data.

A close relative of *harrimani* Bks., this species is distinguished by the shorter cerci and less ornamented lateral arms of the ædeagus, fig. 83.

Limnephilus montanus Banks, 1907a, p. 119. (*Anabolia*)

Lectotype, female.—Mt. Katahdin, Maine. No. 11661.

This species has been synonymized with *planifrons* Kol. and *curtus* Banks. Better characters in the female sex of this genus will have to be discovered to determine this with certainty.

Limnephilus morrisoni Banks, 1920, p. 343, figs. 5, 32 and 96.

Lectotype, male.—Reno, Nevada, 1878, Morrison. No. 10873. *Lectoallotype, female.*—Sierra Nevada, 1876, Crotch.

The male genitalia are illustrated in fig. 81. The generic assignment of this species is unsettled.

Limnephilus mutatus (Hagen), 1861, p. 267. (*Hallesus*)

Lectotype, female.—Labrador, Winthem. No. 10688. *Allotype, male.*—Labrador, 1865, Moeschler.

The allotype matches the lectotype so perfectly in general

characteristics and color that there seems no doubt of the correctness of the association. The male genitalia, fig. 66, are distinctive.

Limnephilus nigriculus (Banks), 1908b, p. 262, pl. 19, fig. 11. (*Anabolia*)

Lectotype, male.—Clear Cr., Colorado, September 10, 1889, Oslar. No. 11664.

The male genitalia are illustrated in fig. 68. They form an intermediate step between *modesta*, fig. 65, and *mutatus*, fig. 66.

Limnephilus occidentalis Banks, 1908b, p. 264, pl. 18, figs. 1, 3.

Lectotype, male.—Tacoma, Washington, September 5, 1897. No. 11620. *Lectoallotype, female.*—Wellington, British Columbia, Bryant.

The male genitalia, fig. 60, have small cerci and broad claspers. The lateral arms of the ædeagus are a primitive type.

Limnephilus oslari Banks, 1907a, p. 121, pl. 9, fig. 19.

Lectotype, female.—South Park, Colorado, August 25, 1899. No. 11632.

The color pattern shows this to be the same as *externus* Hagen.

Limnephilus pacificus Banks, 1899, p. 207.

Lectotype, male.—Olympia, Washington, Kincaid. No. 11610. *Lectoallotype, female.*—Tacoma, Washington, September 5, 1897.

This species has been synonymized with *sitkensis* (Kolenati).

Limnephilus nepus new name for

Limnephilus pacificus (Banks), 1900a, p. 254. (*Stenophylax*). Preoccupied by the preceding species.

Lectotype, male.—Pullman, Washington. No. 11663. *Lectoallotype, female.*—Same data, May 4, 1898.

The male genitalia, fig. 67, have a curious ædeagus which is a simple derivative of the *modesta* type (see figs. 65, 66).

Limnephilus pallidus (Banks), 1924, p. 442, fig. 54. (*Apolopsyche*)

Lectotype, male.—Winnipeg Lake, Canada, 1860, Kennicott. No. 14849.

This is a synonym of *parvulus* (Banks).

Limnephilus perjurus Hagen, 1861, p. 258.

Lectotype, female.—Ins. Kenae. No. 10721.

The type lacks the abdomen.

Limnephilus pudicus Hagen, 1861, p. 262.

Lectotype, female.—Washington, D. C., Osten Sacken. No. 10720.

This is a synonym of *submonilifer* Wlk.

Limnephilus pulchellus Banks, 1908a, p. 63, pl. 2, figs. 5, 9.

Lectotype, male.—Grand Lake, Newfoundland, July 28, 1906, O. Bryant. No. 11626. *Lectoallotype, female.*—Same data.

This small species has male genitalia, fig. 78, which bear a marked resemblance to the *vastus* group.

Limnephilus roberti Banks, 1930b, p. 226, figs. 10-12.

Lectotype, male.—Winnipeg Lake, 1860, Kennicott. No. 16318. *Lectoallotype, female.*—Same data.

This species is a synonym of *parvulus* (Banks), fig. 61. The type of this latter species lacks the abdomen, but a topotype specimen which probably belonged to the type series but did not bear a type label agrees perfectly with the lectotype of *roberti.*

Limnephilus sansoni Banks, 1918, p. 19, fig. 8.

Lectotype, male.—Banff, Alberta, Spray Lake, August 25, Sanson. No. 10089. *Lectoallotype, female.*—Banff, August 31.

Belongs to the *sublunatus* group, set off from other members of the group by the following characters, fig. 70: Preanal appendages very wide, with an inner band of heavily sclerotized points; sclerotized portion of the side arms of the ædeagus subdivided at their apex into small projections, otherwise the ædeagus is like *sublunatus.*

Limnephilus secludens (Banks), 1914, p. 152, figs. 17, 27.

Lectotype, male.—Saskatchewan, July. No. 11623.

Close to *tarsalis* Banks, but separated on details of the male genitalia, fig. 63.

Limnephilus sordidus Hagen, 1861, p. 264.

Lectotype, male.—North Red River, Canada, 1858, Uhler. No. 10710.

This species has been considered a synonym of *bimaculatus* Wlk.

Limnephilus spinatus Banks, 1914, p. 149, fig. 8, 9.

Lectotype, male.—Vineyard, Utah, August 22. No. 11617. *Lectoallotype, female.*—Same data, but August 28.

The slender and undivided lateral arms of the ædeagus distinguish this species, fig. 57.

Limnephilus tarsalis (Banks), 1920, p. 342, fig. 104. (*Colpotaulius*)

Lectotype, male.—Ward, Colorado, Oslar. No. 10880.

The male genitalia, fig. 62, resemble most closely those of *secludens* (Banks).

Limnephilus vastus Hagen, 1861, p. 257.

Lectotype, male.—Ins. Kenae. No. 10724.

The abdomen of the type is missing.

Neophylax fuscus Banks, 1903b, p. 242.

Lectotype, male.—Agricultural College, Michigan, Pettit. No. 11643. *Lectoallotype, female.*—Franconia, New Hampshire, Mrs. Slosson.

The male genitalia of this species are illustrated in fig. 86. The species considered and illustrated as this by Betten is quite different.

Neophylax occidentis Banks, 1924, p. 441, figs. 51, 58.

Lectotype, male.—Reno, Nevada, 1878, Morrison. No. 14848.

The male genitalia of this western species are illustrated in fig. 85. The similarity of the fundamental pattern of genitalia with the eastern species, and having the distinctive wart behind the lateral ocellus, indicate that this species forms a primitive subgenus of *Neophylax*.

Neophylax pilosus (Banks), 1930b, p. 228, fig. 13. (*Acronopsyche*)

Lectotype, male.—Modoc Co., California, July 20, 1922, Lindsey. No. 16319. *Lectoallotype, female.*—Same data.

This species, the genotype of *Acronopsyche* Banks, is a synonym of *occidentis* Banks.

Platycentropus amicus (Hagen), 1861, p. 265. (*Halesus*)
Lectotype, female.—New Orleans. No. 10690.
No definite placement of this species can be made until well associated males are found, or good structural characters for separating the females.

Platycentropus hostis (Hagen), 1861, p. 266. (*Halesus*)
Lectotype, male.—North Red River, Canada, 1858, Uhler. No. 10689. *Lectoallotype, female.*—Data illegible.
This species has recently been synonymized with *indicans* (Walker) by Milne (1936).

Platyphylax alascensis Banks.—see *Hesperophylax alascensis* (Banks)

Platyphylax atripes Hagen.—see *Dicosmoecus atripes* (Hagen)

Platyphylax occidentalis Banks.—see *Hesperophylax occidentalis* (Banks)

Pycnopsyche similis Banks.—see *Stenophylax similis* (Banks)

Stenophylax brevipennis Banks.—see *Limnephilus brevipennis* (Banks)

Stenophylax calypso Banks.—see *Drusinus calypso* (Banks)

Stenophylax gilvipes Hagen.—see *Dicosmoecus gilvipes* (Hagen)

Stenophylax lepidus (Hagen), 1861, p. 269. (*Enoicycla*)
Lectotype, male.—Pennsylvania. No. 10697.
The male genitalia have been figured by Betten (1934, pl. 50, figs. 4-6). *Lepida* was sunk by Milne as a synonym of *subfasciata* (Say) but is distinct from that species.

Stenophylax pacificus Banks.—see *Limnephilus pacificus* (Banks)

Stenophylax similis (Banks), 1907a, p. 122, pl. 9, fig. 22. (*Pycnopsyche*)
Lectotype, male.—Chatham, Michigan, August 23, 1900. No. 11659.
The male genitalia show this to be a synonym of *guttifer* Walker.

Family SERICOSTOMATIDÆ

Alepomyia bryanti Banks.—see *Lepidostoma bryanti* (Banks)

Arcadopsyche prominens Banks.—see *Lepidostoma prominens* (Banks)

Atomyia modesta Banks.—see *Lepidostoma modesta* (Banks)

Brachycentrus incanus Hagen, 1861, p. 272.

Lectotype, female.—Washington, D. C., April, 1859, O. Sacken. No. 10455.

This is probably *numerosus* (Say) or *lateralis* (Say). To date, however, diagnostic characters have not been found for the females of this genus.

Brachycentrus occidentalis Banks, 1911, p. 355, pl. 13, fig. 32.

Lectotype, male.—Bon Accord, British Columbia, May 14. No. 11685.

The long, separate cerci and slender, angled claspers, fig. 88, are diagnostic for this western species.

Brachycentrus similis Banks, 1907a, p. 124, pl. 9, fig. 21.

Lectotype, male.—Tabernash, Colorado, August, E. S. Tucker. No. 11684. *Lectoallotype, female.*—Boulder, Colorado, August 9, at light, T. D. A. Cockerell.

This species is a synonym of *americanus* Bks. The short, fused cerci and bilobate claspers, fig. 87, are diagnostic for this widespread species.

Dasystoma rusticum Hagen.—see *Micrasema rusticum* (Hagen)

Helicopsyche arizonensis Banks, 1907a, p. 125.

Lectotype, female.—Nogales, Arizona, July, 1903, Oslar. No. 11694.

Helicopsyche californicus Banks, 1899, p. 210.

Lectotype, male.—Colton, California. No. 11696.

The genitalia are remarkably similar to those of *borealis* (Hagen).

Helicopsyche borealis (Hagen), 1861, p. 271. (*Notidobia*)

Lectotype, male.—St. Lawrence River, Canada, 1859, O. Sacken. No. 10939.

This widespread species has been illustrated by Betten (1934, pl. 66).

Lepidostoma Rambur

Many of the species here placed in *Lepidostoma* have been considered previously as belonging to genera separated from *Lepidostoma* on the basis of male characters such as venation, folds in the wing, structure of antennae, etc. The male genitalia show that in many cases these definitions cut across phylogenetic lines, grouping together species which are at most distantly related and separating species which are really extremely closely related. The male genitalia show further that many of the most distinct of these groups are, at the most, an offshoot of a group of species placed in another genus. I feel, therefore, that many of these genera are only artificial segregates of species without any consideration to relationships. For this reason, I am defining the genus *Lepidostoma* very broadly. I agree with Mr. Banks that a thorough revision of the entire world fauna of this group will be necessary to correctly evaluate the genera.

Lepidostoma bryanti (Banks), 1908a, p. 65, figs. 1, 2, 13. (*Alepomyia*)

Lectotype, male.—Grand Lake, Newfoundland, July 28, 1906, O. Bryant. No. 11709.

This species is a synonym of *wisconsinensis* Vorhies.

Lepidostoma carolina (Banks), 1911, p. 356, pl. 13, fig. 28. (*Notiopsyche*)

Lectotype, male.—Southern Pines, North Carolina, April 28, A. H. Manee. No. 11704.

This species belongs to the *togatum* group as evidenced by the genitalia, fig. 92.

Lepidostoma costalis (Banks), 1914, p. 265, pl. 10, fig. 34. (*Olemira*)

Lectotype, male.—Woodworth's Lake, Fulton Co., New York, August 19, 1909. No. 11701. *Allotype, female.*—Same data.

The allotype is evidently of the type series but did not bear a type label. The species has been illustrated by Betten (1934, pl. 64, figs. 1-5).

Lepidostoma grisea (Banks), 1911, p. 357, pl. 12, figs. 17, 19, 22. (*Phanopsyche*)

Lectotype, male.—Woodworth's Lake, Fulton Co., New York, August 22. No. 11693.

Characteristics of this species have been illustrated by Betten (1934, pl. 64, fig. 6-12). It is a member of the *wisconsinensis* group.

Lepidostoma modesta (Banks), 1905a, p. 217. (*Atomyia*)

Lectotype, male.—Black Mts., North Carolina, May. No. 11702.

The elongate processes of the male tenth tergite, fig. 93, will identify this species.

Lepidostoma prominens Banks, 1930a, p. 129, figs. 1, 8, 10. (*Arcadopsyche*)

Lectotype, male.—Cape North, Cape Breton Island, Nova Scotia, August 7, 1928. No. 16321. *Lectoallotype, female.*—Same data.

The female bears the same label as the lectotype but did not have a type label. The tenth tergite of the male, fig. 91, is diagnostic.

Lepidostoma stigma Banks, 1907a, p. 125, pl. 8, fig. 10.

Lectotype, female.—Boulder, Colorado, August 9, at light, T. D. A. Cockerell. No. 11692.

The placement of this species requires first identification of its corresponding male.

Lepidostoma togatum (Hagen), 1861, p. 273. (*Mormonia*)

Lectotype, female.—St. Lawrence River, Canada, 1859, Osten Sacken. No. 10942.

The traditional interpretation of this species is very likely correct, but until better diagnostic characters are found for the females of this genus, there is no guarantee of it.

Lepidostoma vernalis (Banks), 1897, p. 29. (*Mormonia*)

Lectotype, male.—Sea Cliff, Long Island, New York, March 28. No. 11687. *Lectoallotype, female.*—Same data.

The male genitalia, fig. 90, are characterized by the tooth-beset claspers, hooked processes of the tenth tergite and a pair of setal brushes on the ninth tergite.

Micrasema charonis Banks, 1914, p. 266, figs. 3, 47, 51.

Lectotype, male.—Black Mts., North Carolina, May. No. 11698.

This species differs from *rustica* (Hagen) in the curved apex of the claspers and more elliptic ædeagus, fig. 95.

Micrasema falcatum Banks, 1914, p. 265, fig. 52.

Lectotype, male.—Great Falls, Virginia, May 12. No. 11697.

This is a new synonym of *rusticum* (Hagen).

Micrasema rusticum (Hagen), 1868, p. 272. (*Dasystoma*)

Lectotype, male.—Saskatchewan, Canada, 1860, Kennicott. No. 10938. *Lectoallotype, female.*—Same data.

The details of the genitalia are illustrated in fig. 96.

Mormonia togatum Hagen.—see *Lepidostoma togatum* (Hagen)

Mormonia vernalis Banks.—see *Lepidostoma vernalis* (Banks)

Neothremma alicea Banks, 1930b, p. 229, figs. 4, 5.

Lectotype, male.—Colorado, G. S. Dodds. No. 16320. *Lectoallotype, female.*—Same data.

The male genitalia are illustrated in fig. 89.

Notidobia americana Banks, 1900a, p. 256.

Lectotype, male.—Falls Church, Virginia, June. No. 11714.

This species appears to be the same as *grisea* (Bks.), described from the female.

Notidobia assimilis Banks, 1907a, p. 124, pl. 8, fig. 8.

Lectotype, male.—San Diego, California, G. H. Fields. No. 11715.

This species has been considered the same as *griseola* McL. but is distinct from it on the basis of the claspers, fig. 94.

Notidobia borealis Hagen.—see *Helicopsyche borealis* (Hagen)

Notidobia lobata Banks, 1911, p. 356, pl. 12, figs. 18, 20. (*Schizopelex*)

Lectotype, male.—Woodworth's Lake, Fulton Co., New York, June 22, 1910. No. 11712.

This is a synonym of *distincta* (Ulmer).

Notidobia moesta Banks, 1914, p. 264, fig. 12. (*Psiloneura*) *Lectotype, female.*—Cambridge, Massachusetts, September. No. 11717.

This represents the female of the above, and is a synonym of it.

Notiopsyche carolina Banks.—see *Lepidostoma carolina* (Banks)

Olemira costalis Banks.—see *Lepidostoma costalis* (Banks)

Phanopsyche grisea Banks.—see *Lepidostoma grisea* (Banks)

Psiloneura moesta Banks.—see *Notidobia mœsta* (Banks)

Schizopelex lobata Banks.—see *Notidobia lobata* (Banks)

Bibliography

Banks, Nathan

1895 New Neuropteroid Insects. Transactions American Entomological Society, 22: 313-16.

1897 New North American Neuropteroid Insects. Transactions American Entomological Society, 24: 21-31.

1899 Descriptions of New North American Neuropteroid Insects. Transactions American Entomological Society, 25: 199-218.

1900a New Genera and Species of Nearctic Neuropteroid Insects. Transactions American Entomological Society, 26: 239-59.

b Some Insects of the Hudsonian Zone in New Mexico. Psyche, 9: 123-26.

1901 Some Insects of the Hudsonian Zone in New Mexico. Neuropteroid Insects. Psyche, 9: 286-87.

1903a Neuropteroid Insects from Arizona. Proceedings Entomological Society Washington, 5: 237-45, 1 pl.

b Some New Neuropteroid Insects. Journal New York Entomological Society, 11: 236-43.

1904a Neuropteroid Insects from New Mexico. Transactions American Entomological Society, 30: 97-110, 1 pl.

b Two Species of Hydroptilidae. Entomological News, 15: 116-17.

c Two New Species of Caddice-Flies. Proceedings Entomological Society Washington, 6: 140-42.

d A List of Neuropteroid Insects, Exclusive of Odonata, from the Vicinity of Washington, D. C. Proceedings Entomological Society Washington, 6 no. 4: 211-17, 1 pl. Trichoptera, p. 211-17.

1905a Descriptions of New Species of Neuropteroid Insects from the Black Mountains, N. C. Bulletin American Museum Natural History, 21: 215-18.

b Descriptions of New Nearctic Neuropteroid Insects. Transactions American Entomological Society, 32: 1-20, pls. 1-2.

1907a Descriptions of New Trichoptera. Proceedings Entomological Society Washington, 8 nos. 3, 4: 117-32, pls. 8-9.
b New Trichoptera and Psocidae. Journal New York Entomological Society 15: 162-66. Trichoptera, p. 162-64, figs. 1-5.
1908a Some Trichoptera and Allied Insects from Newfoundland. Psyche, 15, no. 4: 61-67, pl. 2.
b Neuropteroid Insects—Notes and Descriptions. Transactions American Entomological Society, 34: 255-67, pls. 17-19.
1909 Two New Caddis Flies. Entomological News, 20: 342.
1911 Descriptions of New Species of North American Neuropteroid Insects. Transactions American Entomological Society, 37 no. 4. Trichoptera, p. 350-60, pls. 12-13.
1914 American Trichoptera—Notes and Descriptions. Canadian Entomologist, 46: 149-56, 201-5, 252-58, 261-68, pls. 9, 10, 15, 20.
1918 New Neuropteroid Insects. Bulletin Museum Comparative Zoology Harvard, 62. Trichoptera p. 19-22, pl. 1.
1920 New Neuropteroid Insects. Bulletin Museum Comparative Zoology Harvard, 64: 299-362, 7 pls. Trichoptera, p. 342-62.
1924 Descriptions of New Neuropteroid Insects. Bulletin Museum Comparative Zoology Harvard, 65. Trichoptera, p. 439-55, pl. 1, 3, 4.
1930a Trichoptera from Cape Breton, Nova Scotia. Bulletin Brooklyn Entomological Society, 25: 127-32, 10 figs.
b New Neuropteroid Insects from the United States. Psyche, 37: 223-33, 15 figs.
1936 Notes on some Hydropsychidae. Psyche, 38: 126-130, 10 figs.

Betten, Cornelius

1934 The Caddis Flies or Trichoptera of New York State. New York State Museum Bulletin, no. 292: 576 pp., 61 text figs., 67 pls.

Hagen, Herman A.

1860 Die Phryganiden Pictet's nach Typen Bearbeitet. Stettiner Entomologische Zeitung, 21: 274-90.
1861 Synopsis of the Neuroptera of North America, with a list of the South American Species. Smithsonian Miscellaneous Collections. 347 p. Trichoptera, p. 249-98, 328-29.
1864 Phryganidarum Synopsis Synonymica. Verhandlung Zoologische Botanische Gesellschaft Wein, 14: 799-890.
1868 Monographie der Gattung Dasystoma Rambur. Stettiner Entomologische Zeitung, 29: 267-73.
1873 Beitrage zur Kenntnis der Phryganiden. Verhandlung Zoologische Botanische Gesellschaft Wien, 23: 377-452.
1875 Report on the Pseudo-Neuroptera Collected by Lieut. W. L. Carpenter in 1873 in Colorado. Report United States Geological Survey of the Territories for 1873, p. 571-606.

Milne, Lorus J.

1934-36 Studies in North American Trichoptera. Cambridge, Mass., 128 pp., 2 pls.

Morton, Kenneth J.

1905 North American Hydroptilidae. New York State Museum Bulletin 86: 63-75, fig. 15 and pls. 13-15.

Mosely, Martin E.
1934 Some new exotic Trichoptera. Stylops, 3: 139-142, 13 figs.

Plate I

Fig. 1. *Agapetus malleatus* Banks, male genitalia.
Fig. 2. *Glossosoma parvulum* Banks, male genitalia.
Fig. 3. *Rhyacophila atrata* Banks, male genitalia; A, tenth tergite; B, ædeagus.
Fig. 4. *Rhyacophila brunnea* Banks, male genitalia; A, tenth tergite; B, ædeagus.
Fig. 5. *Rhyacophila coloradensis* Banks, male genitalia; A, tenth tergite; B, ædeagus.
Fig. 6. *Rhyacophila acropedes* Banks, male genitalia.
Fig. 7. *Rhyacophila hyalinata* Banks, male genitalia; A, tenth tergite; B, ædeagus.
Fig. 8. *Rhyacophila grandis* Banks, male genitalia; A, tenth tergite.

Plate II

Fig. 9. *Rhyacophila invaria* Walker, male genitalia; A, ædeagus.
Fig. 10. *Hydroptila albicornis* Hagen, male genitalia; A, ædeagus; B, claspers.
Fig. 11. *Hydroptila maculata* (Banks), male genitalia.
Fig. 12. *Stactobia pictipes* (Banks), male genitalia; A, ædeagus.
Fig. 13. *Plectrocnemia aureola* Banks, male genitalia; A, same, ventral view.
Fig. 14. *Metrichia nigrita* (Banks), male genitalia; A, wings.

Plate III

Fig. 15. *Polycentropus arizonensis* Banks, male genitalia; A, same, dorsal view.
Fig. 16. *Polycentropus remotus* Banks, male genitalia; A, tenth tergite.
Fig. 17. *Polycentropus albipunctus* (Banks), male genitalia.
Fig. 18. *Cernotina pallida* (Banks), male genitalia; A, same, dorsal view.
Fig. 19. *Psychomyiella flavida* (Hagen), male genitalia.
Fig. 20. *Cheumatopsyche analis* (Banks), tenth tergite; A, same, caudal view.
Fig. 21. *Cheumatopsyche minuscula* (Banks), ædeagus; A, tenth tergite, dorsal view; B, tenth tergite, lateral view.
Fig. 22. *Hydropsyche hageni* Banks, apex of ædeagus, lateral and ventral views.
Fig. 23. *Cheumatopsyche gracilis* (Banks), tenth tergite, caudal view; A, clasper, caudal view.
Fig. 24. *Cheumatopsyche sordida* (Hagen), ædeagus; A, tenth tergite, dorsal view; B, tenth tergite, lateral view.

Plate IV

Fig. 25. *Hydropsyche phalerata* Hagen, male genitalia; A, apex of ædeagus, ventral view.
Fig. 26. *Hydropsyche californica* Banks, apex of ædeagus, ventral and lateral views.
Fig. 27. *Hydropsyche occidentalis* Banks, apex of ædeagus, ventral and lateral views.
Fig. 28. *Hydropsyche venularis* Banks, ædeagus, lateral and ventral views.
Fig. 29. *Hydropsyche incommoda* Hagen, apex of ædeagus, ventral and lateral views.
Fig. 30. *Hydropsyche slossonæ* Banks, tenth tergite, lateral view; A, same, dorsal view; B, ædeagus.
Fig. 31. *Hydropsyche depravata* Hagen, male genitalia; A, apex of ædeagus, ventral view.
Fig. 32. *Hydropsyche bifida* Banks, ædeagus; A, tenth tergite, dorsal view; B, ædeagus, dorsal view.
Fig. 33. *Hydropsyche morosa* Hagen, ædeagus.
Fig. 34. *Hydropsyche cockerelli* Banks, male genitalia.
Fig. 35. *Hydropsyche oslari* Banks, ædeagus; A, male genitalia.

Plate V

Fig. 36. *Arctopsyche grandis* (Banks), male genitalia.
Fig. 37. *Triænodes grisea* Banks, male genitalia; A, *Triænodes frontalis*, clasper, lateral aspect.
Fig. 38. *Triænodes dentata* Banks, male genitalia; A, clasper, ventral view.
Fig. 39. *Œcetis parva* (Banks), male genitalia.
Fig. 40. *Athripsodes transversus* (Hagen), male genitalia.
Fig. 41. *Athripsodes annulicornis* (Stephens), clasper, caudal view.
Fig. 42. *Athripsodes dilutus* (Hagen), male genitalia; A, clasper, caudal view.
Fig. 43. *Anisogamus disjunctus* Banks, male genitalia; A, ædeagus.
Fig. 44. *Anisogamus* costalis (Banks), male genitalia; A, ædeagus.
Fig. 45. *Asynarchus centralis* Banks, male genitalia; A, ædeagus.
Fig. 46. *Clistoronia formosa* (Banks), male genitalia; A, ædeagus.
Fig. 47. *Apatelia incerta* (Banks), male genitalia.

Plate VI

Fig. 48. *Dicosmœcus unicolor* (Banks), male genitalia.
Fig. 49. *Dicosmœcus atripes* (Hagen), male genitalia.
Fig. 50. *Ecclisomyia maculosa* Banks, male genitalia; A, clasper.
Fig. 51. *Glyphopsyche bellus* (Banks), male genitalia; A, ædeagus; B, male genitalia, dorsal view.
Fig. 52. *Glyphopsyche canadensis* (Banks), male genitalia; A, same, dorsal view; B, ædeagus.

Fig. 53. *Glyphopsyche irroratus* (Fabricius), male genitalia; A, ædeagus.
Fig. 54. *Glyphopsyche subborealis* (Banks), male genitalia; A, ædeagus; B, same, dorsal view of apex.
Fig. 55. *Hesperophylax consimilis* Banks, male genitalia.
Fig. 56. *Limnephilus argenteus* Banks, male genitalia; A, ædeagus.

PLATE VII

Fig. 57. *Limnephilus spinatus* Banks, male genitalia; A, ædeagus.
Fig. 58. *Limnephilus assimilis* (Banks), male genitalia; A, ædeagus.
Fig. 59. *Limnephilus janus* Ross, male genitalia; A, ædeagus.
Fig. 60. *Limnephilus occidentalis* Banks, male genitalia; A, ædeagus.
Fig. 61. *Limnephilus parvulus* (Banks), male genitalia; A, ædeagus.
Fig. 62. *Limnephilus tarsalis* (Banks), male genitalia; A, ædeagus.
Fig. 63. *Limnephilus secludens* (Banks), male genitalia; A, ædeagus.
Fig. 64. *Limnephilus clausus* Banks, lateral arm of ædeagus.
Fig. 65. *Limnephilus modestus* (Hagen), male genitalia; A, ædeagus.
Fig. 66. *Limnephilus mutatus* (Hagen), male genitalia; A, ædeagus.
Fig. 67. *Limnephilus nepus* Ross, male genitalia; A, ædeagus.

PLATE VIII

Fig. 68. *Limnephilus nigriculus* (Banks), male genitalia; A, ædeagus.
Fig. 69. *Limnephilus hageni* Banks, male genitalia; A, ædeagus.
Fig. 70. *Limnephilus sansoni* Banks, male genitalia; A, ædeagus.
Fig. 71. *Limnephilus abbreviatus* (Banks), male genitalia; A, ædeagus.
Fig. 72. *Limnephilus elongatus* Banks, male genitalia; A, ædeagus.
Fig. 73. *Limnephilus sublunatus* Provancher, male genitalia; A, ædeagus.
Fig. 74. *Limnephilus vastus* Hagen, male genitalia; A, same, dorsal view; B, lateral arm of ædeagus.
Fig. 75. *Limnephilus gravidus* Hagen, male genitalia; A, same, dorsal view; B, lateral arm of ædeagus.
Fig. 76. *Limnephilus coloradensis* (Banks), male genitalia; A, B, ædeagus.

PLATE IX

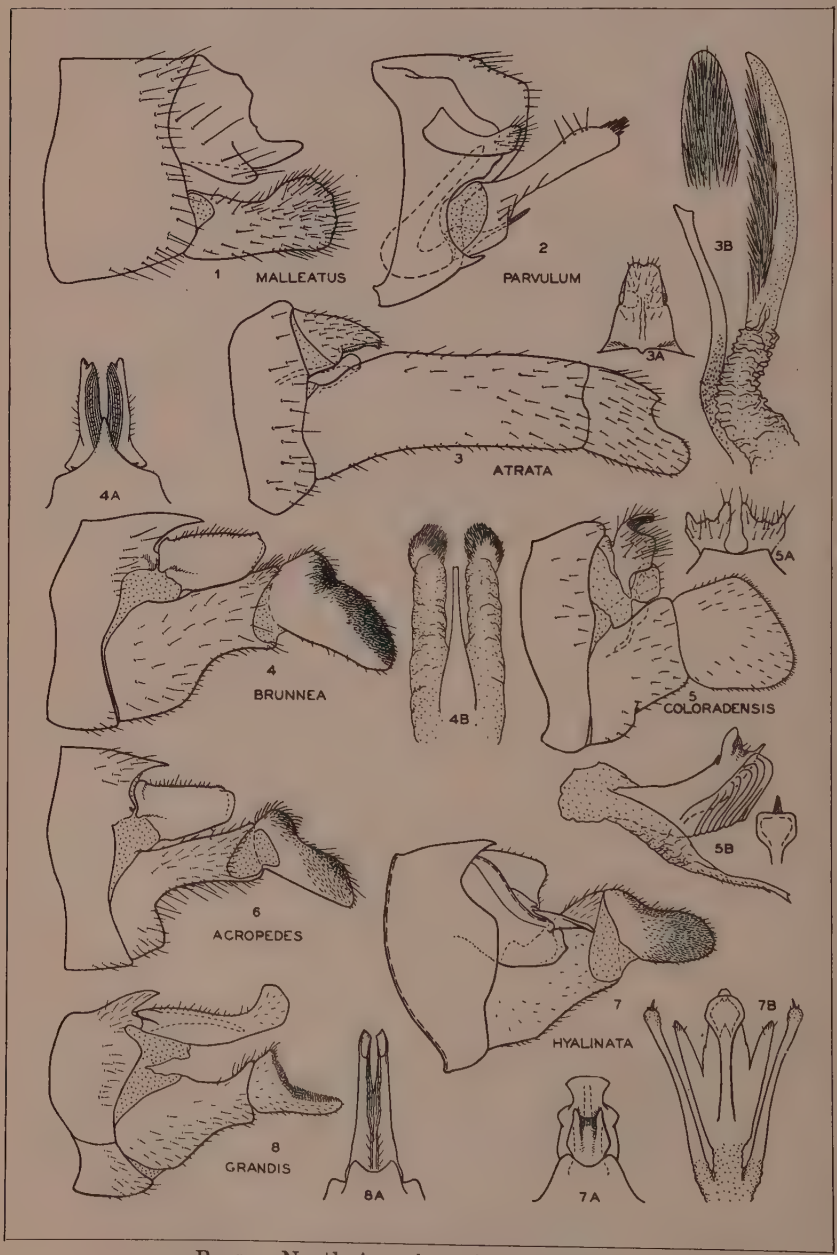
Fig. 77. *Limnephilus brevipennis* (Banks), male genitalia; A, ædeagus.
Fig. 78. *Limnephilus pulchellus* Banks, male genitalia; A, same, dorsal view; B, ædeagus.
Fig. 79. *Limnephilus diversus* (Banks), male genitalia; A, ædeagus.
Fig. 80. *Limnephilus externus* Hagen, male genitalia; A, ædeagus.
Fig. 81. *Limnephilus morrisoni* Banks, male genitalia; A, ædeagus.

Fig. 82. *Limnephilus harrimani* Banks, male genitalia; A, ædeagus.
Fig. 83. *Limnephilus mœstus* Banks, male genitalia; A, ædeagus.
Fig. 84. *Limnephilus cockerelli* Banks, male genitalia; A, ædeagus.
Fig. 85. *Neophylax occidentis* Banks, male genitalia.
Fig. 86. *Neophylax fuscus* Banks, male genitalia, caudal view; same, ventral view.

PLATE X

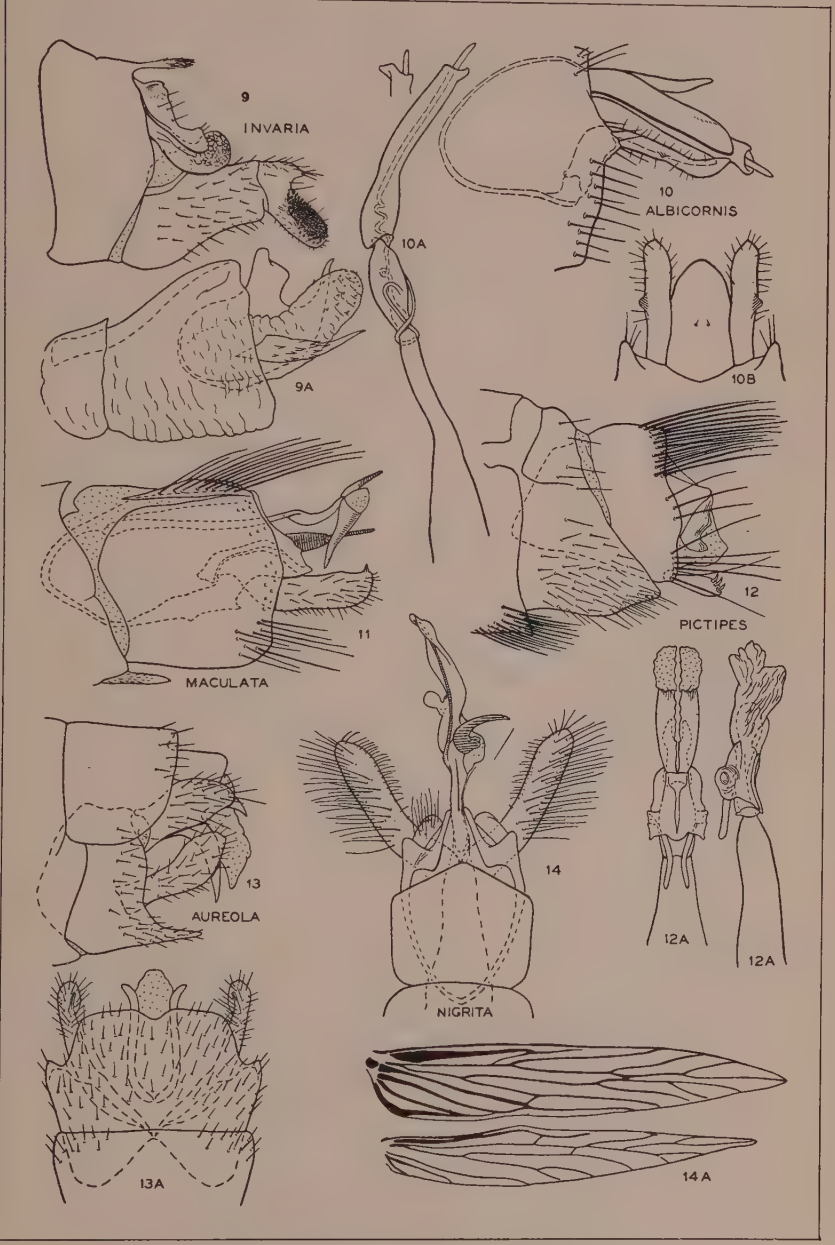
Fig. 87. *Brachycentrus americanus* Banks, male genitalia.
Fig. 88. *Brachycentrus occidentalis* Banks, male genitalia.
Fig. 89. *Neothremma alicea* Banks, male genitalia.
Fig. 90. *Lepidostoma vernalis* (Banks), male genitalia; A, same, dorsal view.
Fig. 91. *Lepidostoma prominens* Banks, male genitalia.
Fig. 92. *Lepidostoma carolina* (Banks), male genitalia; A, tenth tergite, dorsal view.
Fig. 93. *Lepidostoma modesta* (Banks), tenth tergite, lateral view.
Fig. 94. *Notidobia assimilis* Banks, clasper.
Fig. 95. *Micrasema charonis* Banks, male genitalia; A, ædeagus and tenth tergite, dorsal view.
Fig. 96. *Micrasema rusticum* (Hagen), ædeagus and tenth tergite, dorsal view; A, tenth tergite, lateral view; B, clasper, lateral view; C, style of tenth tergite.

Psyche, 1938 VOL. 45, PLATE I.

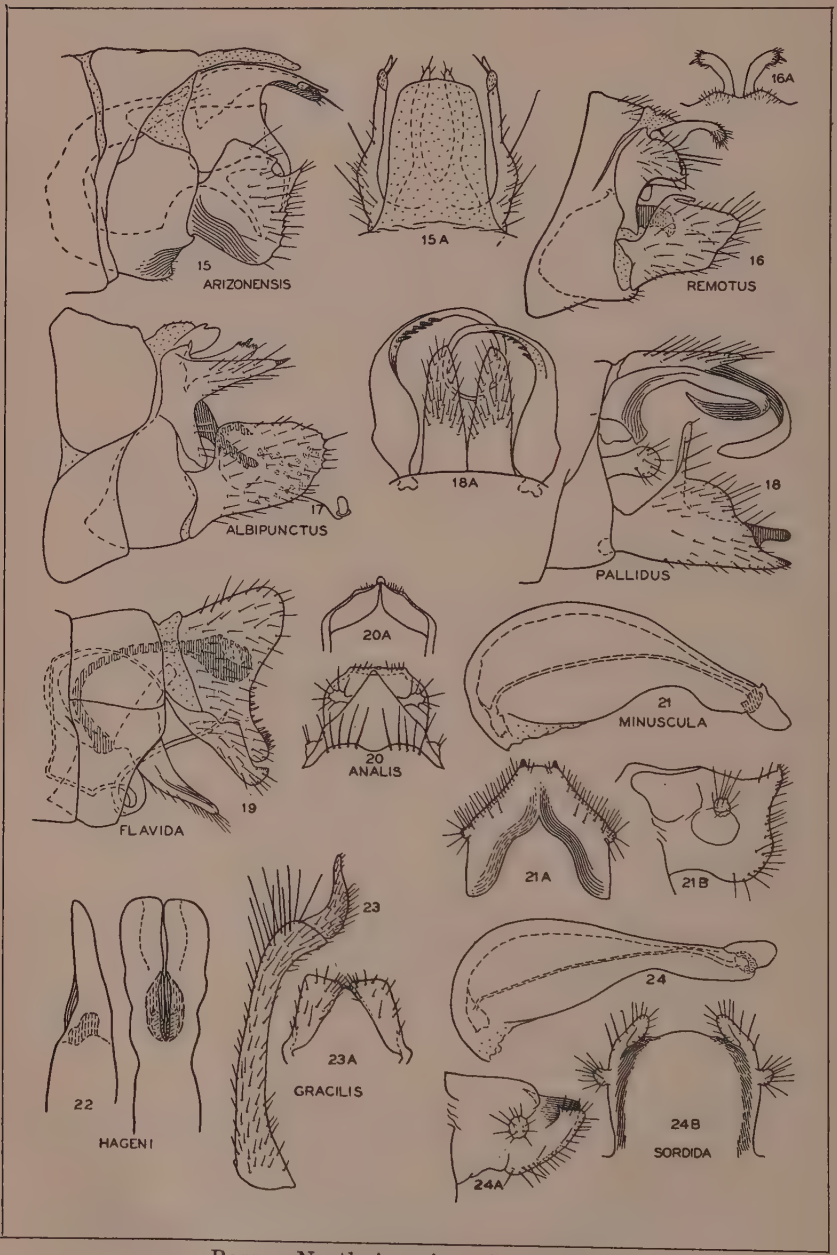


Ross — North American Caddis Flies

Psyche, 1938 Vol. 45, Plate II.

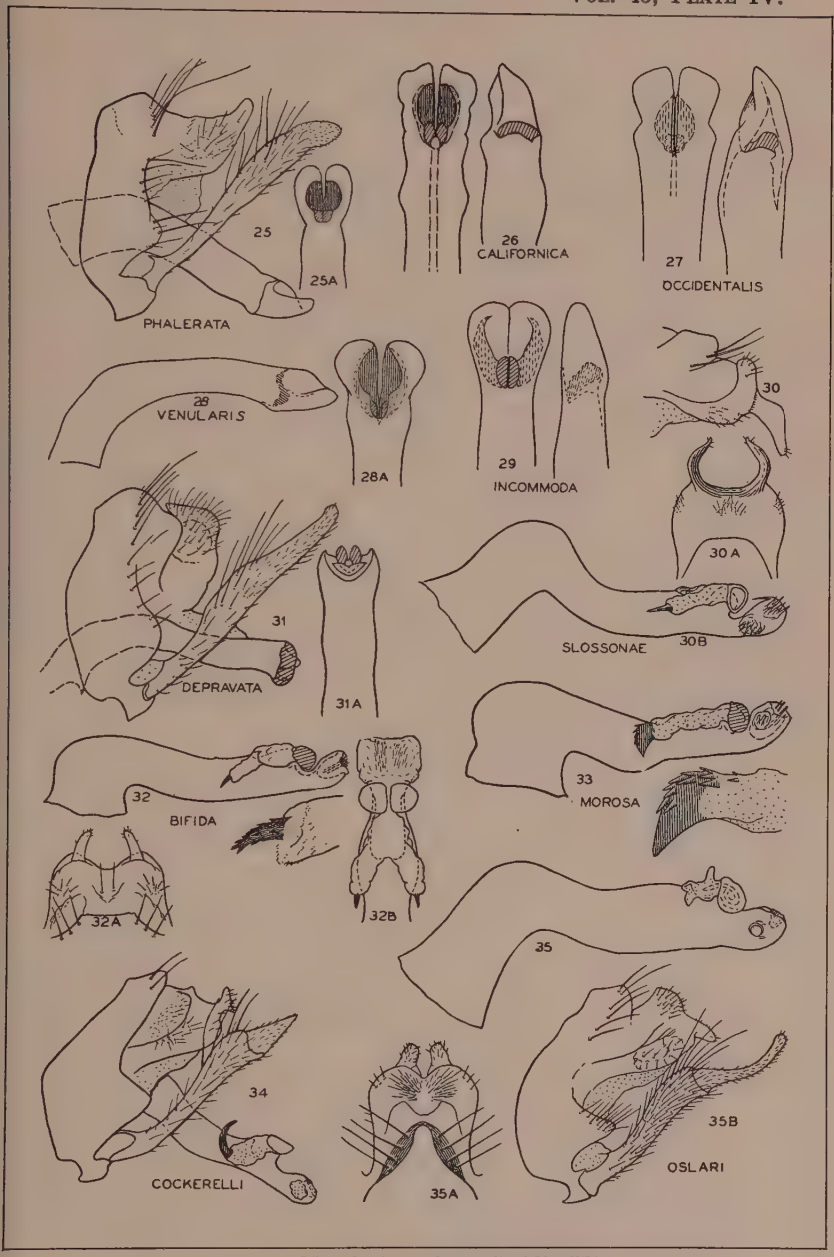


Ross — North American Caddis Flies



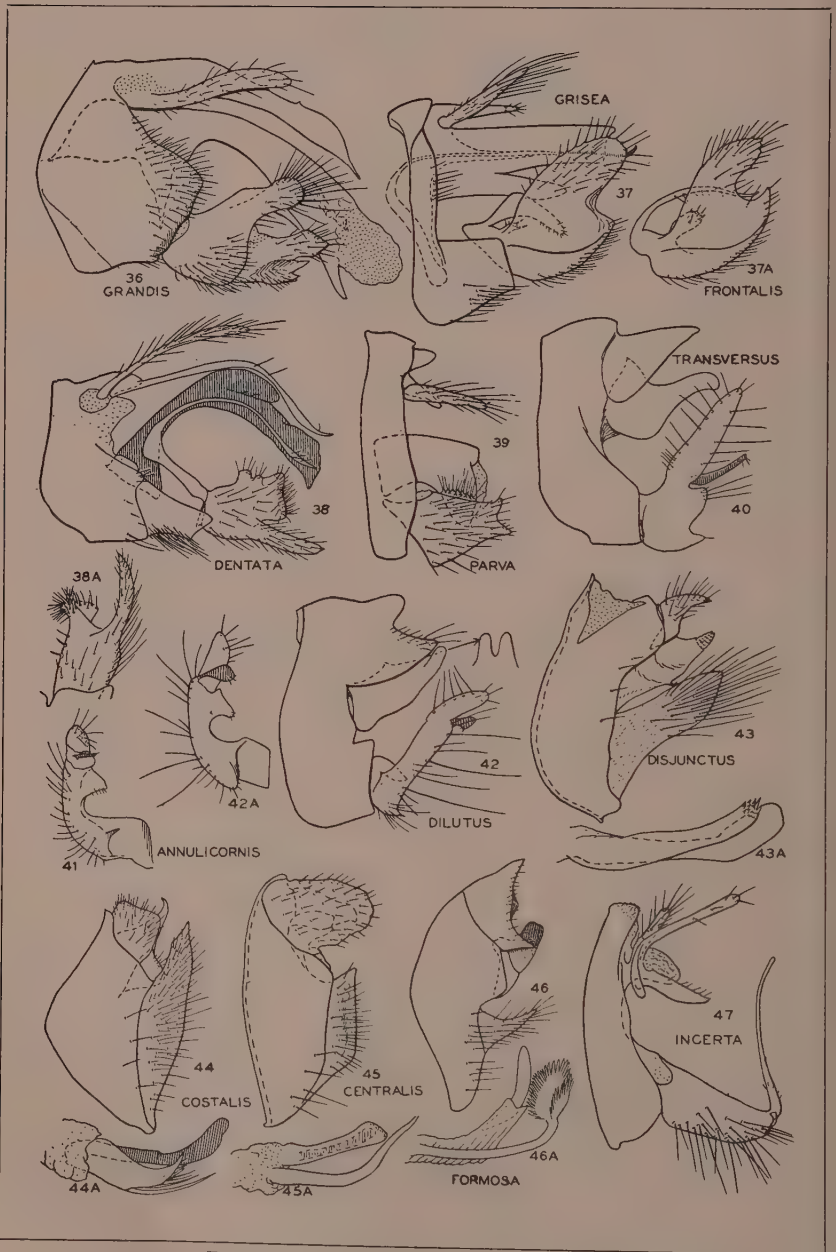
Ross — North American Caddis Flies

Psyche, 1938 Vol. 45, Plate IV.



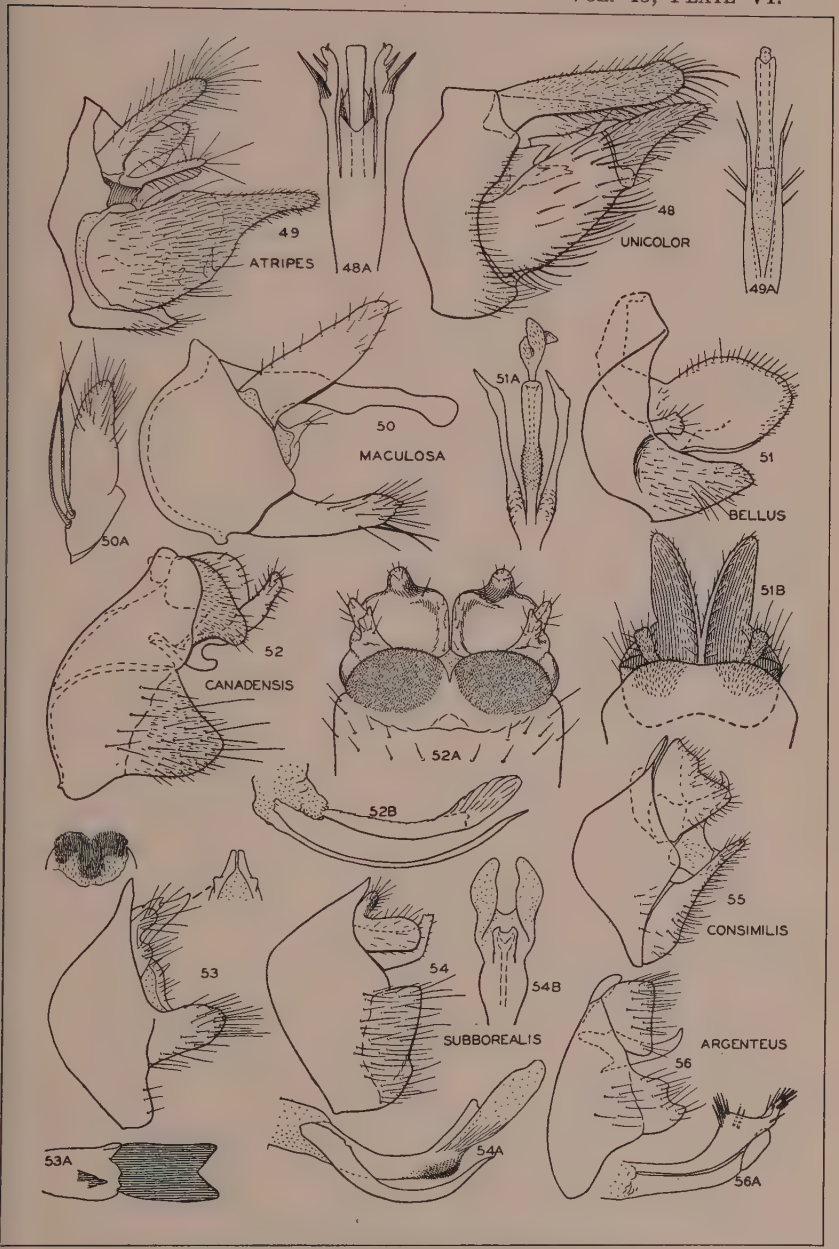
Ross — North American Caddis Flies

Psyche, 1938 VOL. 45, PLATE V.

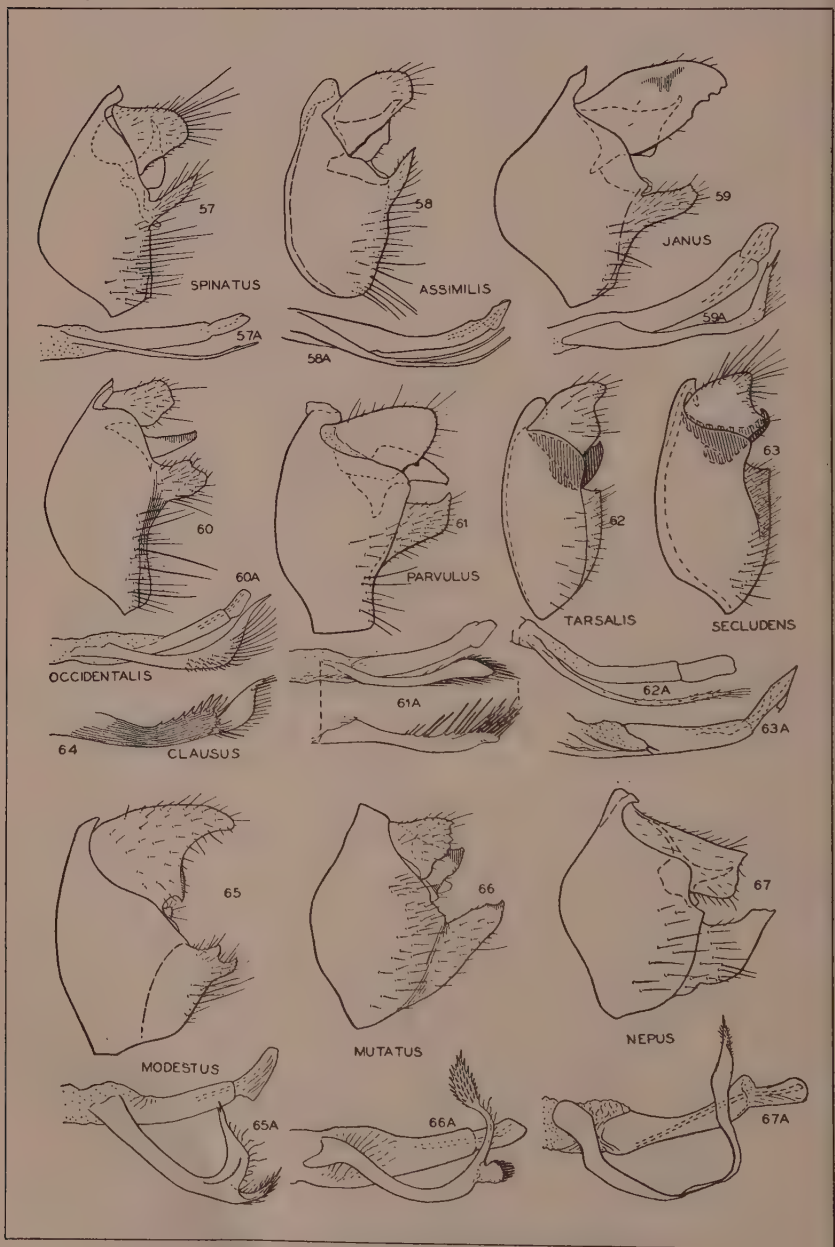


Ross — North American Caddis Flies

Psyche, 1938 VOL. 45, PLATE VI.

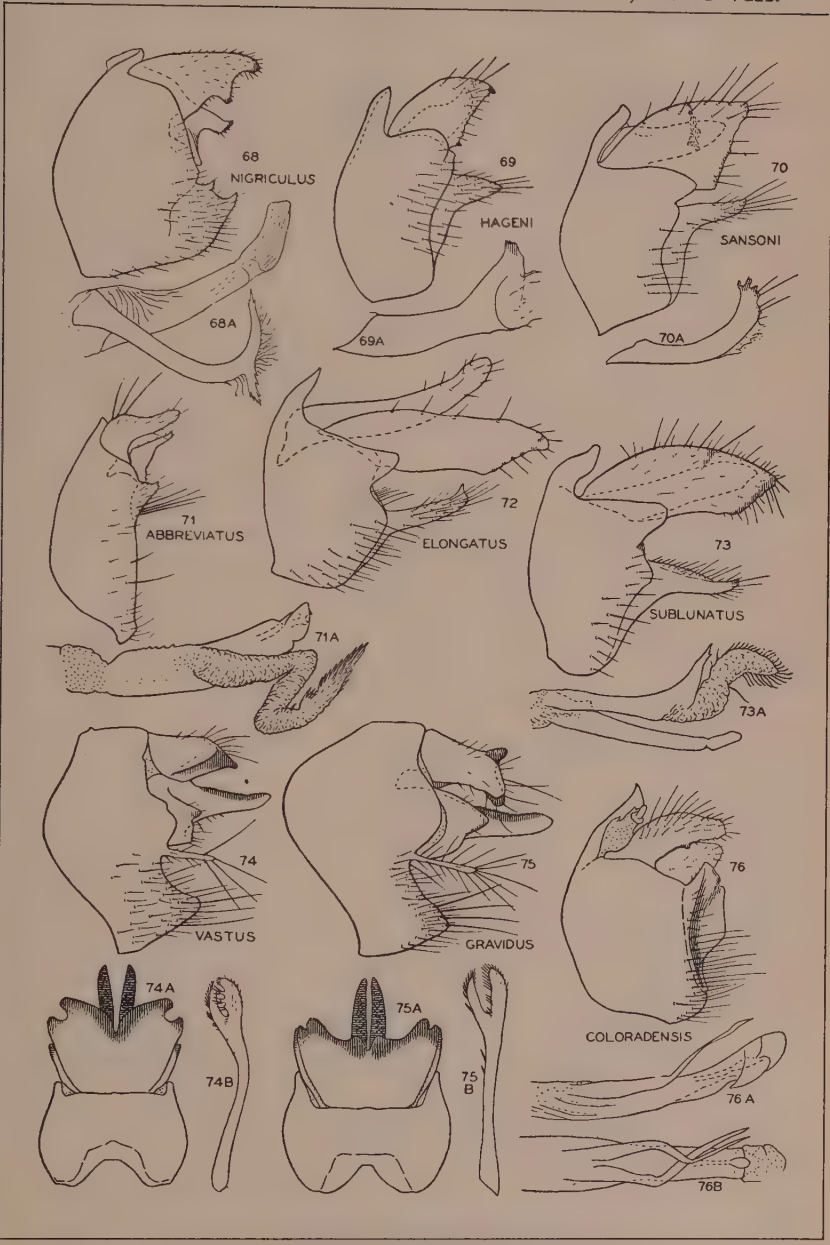


Ross — North American Caddis Flies

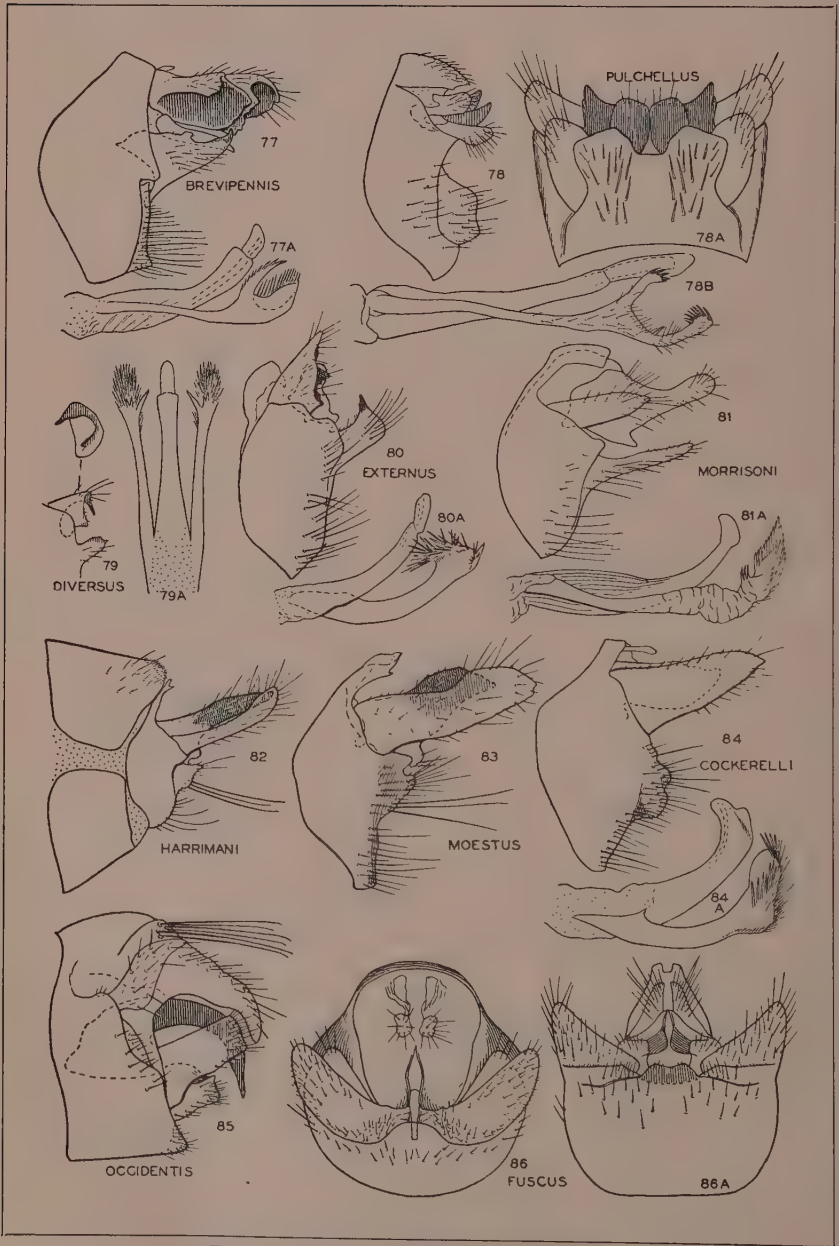


Ross — North American Caddis Flies

Psyche, 1938 VOL. 45, PLATE VIII.

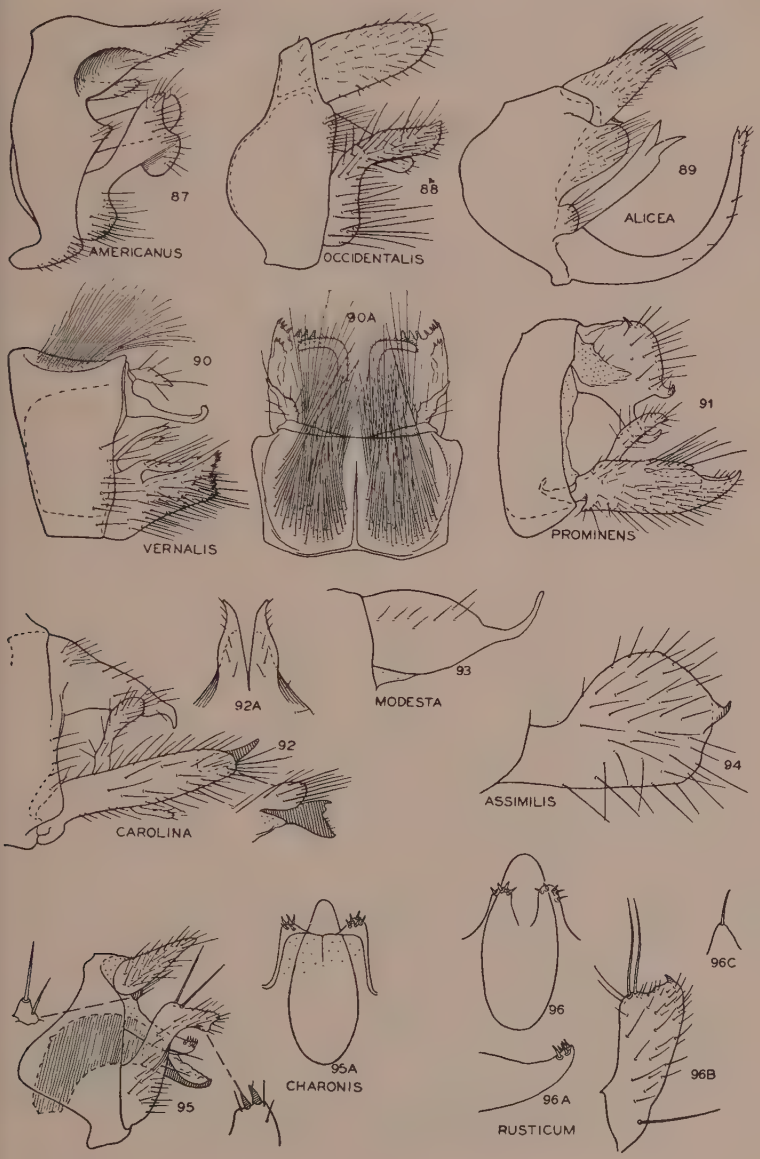


Ross — North American Caddis Flies



Ross — North American Caddis Flies

Psyche, 1938 Vol. 45, Plate X.



Ross — North American Caddis Flies

"SHUTTLING" IN *ARGIOPE AURANTIA*

By F. L. Wells

Harvard Medical School

"*Shuttling:* The spider, resting at orb-centre, moves through the web and assumes a corresponding position on the opposite side. Seen almost exclusively in *A. aurantia*. . . ." (Psyche, 1936, 43, pp. 11-12). The present paper goes on to discuss the data so far obtained, through observations in the field, concerning this relatively distinctive response pattern.

The effective stimulus to shuttling is here the approximating of a vibrating tuning fork, of 128 or 256 v.d. rate, to the dorsum of the spider, no web intervening or touched by the fork. In 1935 the 128 fork was generally used, in 1936 the 256; in direct comparisons there has not been enough difference in the responses to justify their systematic separation for present purposes. Besides the shuttling behavior, various other kinds of reaction occur to this stimulus in *A. aurantia,* but only spreading, reaching and seizing[1] are of frequency significant for present purposes. No comparable phenomenon was observed by the writer in the other species concerned, *viz.* the closely related *A. trifasciata,* and the *Epeiras cavatica, domiciliorum, insularis, stellata, trifolium.* To these species previously mentioned in this connection, are to be added *C. conica* and *E. strix.*[2]

These studies concern the seasons of 1935 and 1936 as above, but the procedures differed somewhat in the two years, and are presented separately.

[1]For definitions of these terms, see the paper of above reference. Spreading, reaching and seizing are mutually continuous patterns, and their recording proceeds along the lines of a "rating scale." The notation of such responses under field conditions presents problems similar to those dealt with by R. W. Washburn, J. Genet. Psychol. 1932, 40, 84-89; Psychol. Monographs, 1936, 47, 74-82.

[2]Taxonomy by advice of Professor Nathan Banks and Miss E. B. Bryant.

1935 Data

The 1935 observations concern 55 individuals, with 167 fork-to-dorsum responses, on 129 occasions.[3] The points to be dealt with concern maturation effects, repetitions of stimulus, accessory responses and shuttlings to other than the normal stimulus.

Maturation. It appears that the shuttling pattern is to no little extent a function of the degree of maturation. *A. aurantia* changes in appearance so characteristically in the course of its growth, that statement in these terms should not be too difficult, but the present observations are recorded by date only. The following figures represent the situation with the fork-to-dorsum stimuli where the response involved shuttling, and if shuttling did not occur, the nature of the principal response that was made.

Dates ..... to	7-31-35	8-1-35 to 8-17-35	9-1-35 to 9-15-35	9-16-35 to 9-30-35	10-1-35 on
No. of responses	31	75	30	21	10
per cent shuttle	58	17	23	10	0
per cent spread	19	40	3	10	40
per cent reach	6	16	23	24	10
per cent seize	0	18	23	28	0
per cent others	13	7	23	14	10
per cent imperceptible	3	1	3	14	40

[3]An "occasion" is here a period during which an individual is observed uninterruptedly. Notes of observations on one individual, then on a second individual, then on the first again, would embody three "occasions."

The figures in this report share in the limitations that beset quantitations of behavior generally, "intelligence quotients" for example. Their function is to depict in specially condensed form, the trend of a mass of detail. Even numbers of individuals are approximations. One may perhaps take for granted that an identical appearing individual occupying the same nest, is the same spider; but less so that an *A. aurantia* appearing in a new location has not been previously observed in another one. One night in early September, 1934, a high wind blew from a southerly direction across the area under study. On next visit (9-10-34) nearly all the *aurantias* had disappeared from a certain portion, and newcomers were plentifully distributed along a stone wall bounding this portion on the north.

The location is some old pasture land in Hopkinton, Mass., 20-25 miles from the writer's domicile and work, which accounts for the irregular periods of observation. In each year, the writer was absent during the latter half of August.

The meaning of these data is believed to be, essentially, that the response pattern increased in aggressiveness as the summer advanced, and subsequently regressed with the coming of autumn. This is directly represented in the progressive decrease of shuttlings, with increase of seizings until the autumn. The reachings show similar increases followed by decrease. In the spreadings, the first increase represents a stage in the maturing of the attack pattern; the second increase was similarly a phase of regression in the attack pattern. The large proportion of "imperceptibles" during the final period will be noted.

Repetition of stimulus. If the spider has once shuttled, she normally, if undisturbed, returns of herself to the original position after an interval of seconds or minutes (see below, 1936 data). If the fork-to-dorsum stimulus be applied to the spider in the changed position, she normally shuttles back, and this process can be repeated to various extents. Only quite limited trials of this nature were made in 1935, but numbers of shuttling repetitions actually observed were,

times shuttled	2-3-4-5-6-*-20
times observed	9-3-0-1-1-4- 1

(*denotes designation in field notes as "repeatedly".)

The extreme case (8-17-35) was otherwise distinguished. A mature individual, she had been remarked on several previous occasions for an exceptional tendency to drop to the ground when approached, which had made tuning fork observation difficult. In this respect and in the shuttling, she was presenting an immature, regressive type of behavior, at a somatic age when more aggressive patterns were characteristic of her neighbors. When various individuals are observed repeatedly, as in these studies, one comes to recognize distinctive "personalities" in certain of them, sometimes regressive as here, sometimes peculiarly aggressive (cf. 1936 data, below).

Accessory responses. The above individual in the last five trials preceded the shuttling with a slight spreading. In only two instances, in other individuals, was extinction of

the shuttling responses observed, after 3 and 5 shuttlings respectively; it was then replaced by spreading. The shuttling response appeared to mask the spreading in the less behaviorally matured individuals, but the shuttling being on its way to extinction, the spreading became overt.

A word as to the significance of the spreading pattern. As seen in *A. aurantia*, it commonly involved the first pair of legs only; inviting the anthropopsychic analogy of "stick 'em up" (to a threatening stimulus, as an attacking wasp). A lay observer indeed interpreted this and the reaching movements as "fending off" the fork. Actually, it is here

Fig. 1. A. *aurantia* no. 10 (7-18-36); an individual of specially aggressive response pattern. Note relative size of cephalothorax. The posture, and web stabilimentum are also relatively close to the adult type.

looked on as a frustrated pattern of aggression; of which it is the necessary initial phase, the spider extending the legs preliminary to grasping the prey in them. The reaching pattern represents a transition stage to the fully developed seizing pattern common in the maturer individuals.

One has then, to do with a mixture of the clearly regressive shuttling pattern, and the undeveloped aggression of spreading. In 18 of the above 129 occasions of 1935, the shuttling occurred in combination with one or more of the other response types. In most cases the response in question preceded the shuttling, and naturally, since shuttling removes the spider from the characteristic stimulus. After

shuttling, the venter is towards the fork, a quite different stimulus situation, having its own patterns of response. On these 18 occasions, shuttling was preceded by spreading in 9 instances; by reaching in 5 instances, by seizing in one instance. In two instances the spider after shuttling, retreated, and in another instance withdrew the abdomen (common response in the young *trifasciata*). The spreading, reaching and seizing here combine with the shuttling in reverse order of their aggressiveness, but this was not the case in 1936.

Shuttling to other stimulus. In the 129 occasions of present reference, the stimulus is given by the fork approximated to the spider's dorsum, at orb-centre. Other analogous stimuli, to perhaps six times this number, were also applied, including fork vibrating in other positions, and silent but oscillated. Shuttling was observed to stimuli other than vibrating fork-to-dorsum on 9 of these occasions. One of these shuttlings was to a vibrating fork touched to the periphery of the orb; two were on fork-to-dorsum but spider not at orb-centre; two were on the approach of a fork silent but rapidly oscillated. One individual shuttled upon vibrating fork stimuli applied to dorsum, venter and orb periphery. When to venter, it is *towards* the fork; there was one other instance of this anomalous response. In one instance the shuttling occurred when the fork touched a leg; in another, upon the examiner's mere approach. Fork-to-dorsum with *aurantia* not at orb-centre is a situation little observable, but the response to it is probably similar to that at orb-centre.

1936 Data

During 1933, 1934 and 1935, *A. aurantia* was abundant in the area concerned. At the close of the 1935 season, eggsacs were found with exceptional readiness. In 1936, the earliest individuals were observed at a date comparable to 1935 (about 3 weeks later than 1934), and in numbers compared well with the young of the two previous years; but although search was carried on with similar care, a scant dozen individuals were observed during this year, that were past the adolescent stage. (The *Argiopes* seemed more affected than other species; *trifasciata* especially so.) The total occasions

involving fork-to-dorsum stimuli is but 50 against 129 of 1935. The amount of observation in the 1936 studies is comparable, being more intensive and controlled than previously.

The following figures are with reference to time of year, tabulated in the same general manner as the 1935 data, by occasion, only one response reckoned per occasion; shuttling if it occurred, otherwise the principal response that was made:

Dates	7-11-36 to 7-31-36	8-1-36 to 8-15-36	9-5-36 to 9-20-36
Occasions with fork-to-dorsum stimulus	28	11	11
per cent shuttle	57	36	9
per cent spread	7	27	45
per cent reach	11	9	18
per cent seize	14	27	18
per cent others	0	0	0
per cent imperceptible	11	0	9

The psychology indicated differs somewhat from that of 1935. More in detail; on 7-11-36 four young *aurantias* were observed for the first time of any that year. In these individuals and one other, the apparent order of somatic maturation was one day later, from least to most, nos. (3), (1), (5), (4), (2). To initial fork-to-dorsum stimulus, (1) and (4) shuttled at once; (2) reached and then shuttled; (3) reached slightly, then dropped to substratum. Response to subsequent (not necessarily in succession) fork-to-dorsum stimuli were:

1 After spontaneous return in 2 minutes, reaching reactions, diminishing to imperceptible (fork 128); spread to fork 256.

2 Four shuttlings with spontaneous returns, in about 10″, 45″, 4′ and 5′ respectively; succeeding four shuttlings preceded by reaches, but no extinction.

3 After return to orb-centre in 5′, seven shuttlings from original position, with time of spontaneous return as follows: 30″, 2′, 1′, 15″, 7″, 10″, 40″.

4 Four alternate shuttlings and back, all to stimulation; on next stimulus, drop to substratum.

On next observation, 7-12-36, 4 was unavailable, others reacted as follows:

Spider No.	Fork-to-dorsum-stimulus No.				
	1	2	3	4	5
	drop 8 in., back in 10″	drop 6 in., back in 3″	shuttle	shuttle back[1]	shuttle
2	reach, then shuttle, back in 5″	reach, then shuttle, back in 5″	reach, then shuttle, back in 1′	shuttle	shuttle back
3	shake	shake, then shuttle	shuttle back	shuttle	shuttle back
5	shuttle, back in 1′	shuttle	shuttle back	shuttle	shuttle back

Subsequent

1 Changes to reaching, continuing for three successive stimuli by fork 128.

2 Alternate shuttle and back for eight further stimuli, with accompanying spread or reach; later stimuli no shuttle, spread or reaching only, including final stimuli by fork 128.

3 With one intercurrent exception (shift and shake) seven each alternate shuttle and shuttle back, no reach or spread, no diminution of reactivity.

5 Uncomplicated shuttle and shuttle back for 22 more stimulations, last four to fork 128. Later occasion, this date, 34 responses: shuttling changing to reaching, to fork 256; then repeated shuttling to fork 128; then again shuttling changing to spread to fork 256; then further shuttling and back to fork 128.

In 1935, and in the earlier observations of 1936, the fork was regularly approximated tip to spider's dorsum, long axis of fork about 45° to vertical axis of orb, moved through a plane at right angles to the plane of the orb. It was noted that in minor asymmetries of stimulation therein arising, the spider uniformly shuttled in a direction away from that of the fork's approach, though the movement might not begin till the fork seemed quite opposite the dorsum. In later observations, principally those of 7-18-36, effort was made at more control of this factor. The fork was held vertical, and moved in a plane parallel to the plane of the orb. The tip of the fork then approached the dorsum either by a lateral movement from right or left (designated L) or downward from above (designated A; location of nests made it impracticable to approach upward from below). In such observations it is vital that no strand of the web be touched by the vibrating fork; often no easy matter, as it is

[1]"Shuttle" denotes movement from normal station; "shuttle back" denotes return to normal station.

the frequent practise of these creatures to put a screen of irregular threads on the side of the orb where they normally rest.

If the shuttling were due essentially to asymmetry of fork stimulation, it should be relatively inhibited in the case of stimulation given as symmetrically as possible. In the 7-18-36 observations, each of the young *aurantias* available had its first fork-to-dorsum stimulus downward from above. Responses to this and subsequent stimulations were essentially as follows:

Spider No.	Stimulus No., Direction and response			Subsequent
	1	2	3	
4	A reach	L reach spread	A reach, spread	L reach, spread
5	A spread	A spread, shuttle	L shuttle back	L shuttle and back, then imperceptible; after 1′ one shuttle and back, then refractory to both forks.
9	A seize	L seize	L spread	To 6 subsequent L stimuli: 4 reaches, 2 seizes, no shuttle.
10	A seize	L shuttle	L shuttle back	L, to 7 stimuli shuttle and back, then spread, then imperceptible. Same pattern on two subsequent series this date.
11	A seize	A reach	A imperceptible	To 15 subsequent L stimuli, all spread or reach except 1 shuttle, 1 seize.

In these and an added number of other observations prior to August 1, the indication is, that shuttling is somewhat less likely to occur if the stimulus is symmetrical or nearly so. In only one of the 7-18-36 trials of stimulus from above did shuttling occur, and the failure of shuttling in the case of lateral stimulus appears in general a phase of negative adaptation. The uniformity of shuttling in a direction opposite to the fork's approach, is confirmed. The seizings are puzzling. It is hard to exaggerate the violence with which the diminutive creature would literally hurl itself upon the fork, wholly abandoning the nest, and needing to be scraped off the fork for return to the nest. Nothing resembling it

was seen in the adolescent *aurantias* of 1935. Stimulus from above (often the only way to give a bilaterally symmetrical stimulus, owing to the "screen") is apparently among the factors, but individual difference at least as much so. The aggressive patterns of 10 were especially conspicuous (fig. 1).

The following indicates the distribution of responses to all fork-to-dorsum stimuli recorded 7-18-36 to 7-31-36 (9 individuals):

per cent	shuttle	spread	reach	seize	other	imperceptible
Stimulus from above (18)	11	11	17	33	17	11
Stimulus lateral (102)	38	13	20	11	12	5

These figures compare as follows for responses of 7-12-36 and for those subsequent to 7-31-36 (10 individuals):

per cent	shuttle	spread	reach	seize	other	imperceptible
7-12-36 (114)	82	8	8	0	3	0
after 7-31-36 (52)	17	33	11	23	4	11

With regard to accessory responses, the situation is similar to that of 1935. Reaching, spreading or seizing may precede the shuttling, but in the 1936 series, the response most frequently combined is reaching rather than spreading. Reaching and spreading again appear, as in 1935, as the shuttling response becomes extinguished. Dropping, a response prominent in the literature of such-like stimulation, is nearly absent from these observations, but from its rare instances, and experience with it in other species, it is surmised to be a response more characteristic than shuttling among individuals younger than have here come to observation.

Only one instance is recorded of shuttling to a stimulus other than fork-to-dorsum; this was on the touching of a leg by an electric vibrator (not the "buzzer" mentioned in the previous report; **11**, 8-8-36). This vibrator, made from an electric bell, was little applied as a "to dorsum" stimulus, but gave evidence of being a weaker stimulus than either of the forks.

In conclusion, the evidence for shuttling as a pattern distinctive of *A. aurantia* among the species of present study,

is briefly reviewed. So far as the other species were available, they were studied in the same manner as *A. aurantia;* but relative scarcity of individuals (*e.g., E. stellata*) and/or differences of habit (*e.g., E. strix*) interfere with close comparisons. The following gives the writer's view of the evidence from these observations for the *absence* of shuttling as a comparable response pattern in the species concerned (there is at hand no evidence of its presence) :

	adolescent	adult	day	night
A. trifasciata	good	good	only	none
C. conica	fair	good	only	none
E. cavatica	fair	good	good	good
E. domiciliorum	meagre	fair	fair	fair
E. insularis	meagre	good	X	only
E. stellata	meagre	fair	only	none
E. strix	good	good	X	only
E. trifolium	meagre	good	X	only

The apparent absence of the pattern in *trifasciata, aurantia's* near biological relative, will be noted. *C. conica* and the *Argiopes* are normally at orb-centre by daylight; *E. cavatica, E. domiciliorum* and *E. stellata* may be either at orb-centre or in retreat. *E. insularis, strix* and *trifolium* are normally in retreat during daylight. The effect of night on the shuttling behavior of *A. aurantia* also awaits further study; the general tendency of the observations is however, that the behavior of the various species concerned is more aggressive at night.

NEW NATIVE NEUROPTEROID INSECTS

By Nathan Banks

The following few descriptions are based on materials gradually accumulating in the Museum of Comparative Zoology. A generic synopsis of our Capniinae, including two new genera, is based on characters that, I believe, are better than those previously used in this group.

ORDER CORRODENTIA

Family Psocidae

Polypsocus corruptus Hag.

In the South there are two varieties which should be named:

P. corruptus var. **pictilis** n. var.

Females differing from typical *corruptus* in having a large pale area in middle of fore wing, similar to that of the normal male of *corruptus*, but more distinct; the preapical pale band is as in normal females. In male this middle pale area is more extended so as to meet the pale apical spot beyond the stigma, thus isolating the dark stigma. In none of these specimens is the stigma reddish as is common, but not constant, in typical *corruptus*. Size same as typical form. This form was very common in the Smoky Mountains of Tennessee, near Newfound Gap, at about 5000 feet, in September. In the valleys the typical form was common. Type M.C.Z. no. 22659.

P. corruptus var. **omissus** n. var.

The male differs from the typical form in lacking all pale marks in the fore wing, neither the median area nor the triangular area beyond stigma, only the minute pale dot at base of stigma, and at base of areola postica. The two males have slightly shorter wings than usual. From Great Falls, Va., 21 July, and Clarksville, Ga., 10 Aug. Type M.C.Z. no. 22660.

ORDER PLECOPTERA

Family Perlidae

Capniinae

The genera occurring in the United States can be tabulated as follows:

1. The radius at origin of radial sector plainly bends forward a little 2
   Radius at origin of radial sector straight 4
2. Several cross-veins in the subapical area ..... *Capnoura*
   No such cross-veins 3
3. First anal vein bends around a large triangular scar *Capnia*
   First anal, although slightly curved, not bent around a large scar ..... subgen. *Arsapnia*
4. Anal area of hind wing reaches to the tip of wing *Allocapnia*
   Anal area not reaching more than three-fourths of way to wing tip 5
5. No oblique cross-vein beyond end of the subcosta, very slender species ..... *Nemocapnia*
   An oblique cross-vein beyond end of the subcosta 6
6. Large, heavy species; setae very long, usually five or six costal cross-veins ..... *Isocapnia*
   Slender, small species, setae very short, of only a few joints, but one or two costal cross-veins . *Eucapnopsis*

Isocapnia gen. nov.

Rather large, heavy species; radius not bent at origin of radial sector, an oblique vein beyond end of subcosta, several (five or more) costal cross-veins; setae long, twenty or more joints, four or five or more near base very short; anal area of hind wing not reaching to tip of wing. Much larger species than others of the subfamily.

Genotype, *Arsapnia grandis* Bks.

There are at least four species, *Capnia crinita* Claassen,

I. fumosa, herewith described, and a clear winged species in which the radial sector is forked beyond the cross-veins; all are from the northwestern parts of United States and western Canada.

Isocapnia fumosa sp. nov.

Figure 3

Body black, posterior parts of meso and metanotum polished, legs, antennae, and setae also uniformly black. Both wings fumose, almost black on front part, the cells behind are paler in the middle, veins black. Body with only minute hairs, those on legs not half as long as in *I. crinita.*

Pronotum a little broader than long, scarcely at all narrowed behind.

In fore wings six to nine costal cross-veins, oblique vein arising about its length beyond the subcosta; all apical veins unforked; in hind wings several (four to five) costal cross-veins, lower branch of medius forked; anal area reaches about two thirds way to tip.

The last dorsal segment of the abdomen projects at a slight angle in the middle. The ventral plate is broad and broadly rounded, each side of its median tip a ridge runs obliquely over the next segment.

Length of fore wing 16 mm.

From Oregon National Forest, Herman, Oregon, 18 April, 1920, and Junction City, Oregon, 7 April, 1919 (both A. C. Burrill). Type M.C.Z. no. 22661.

Nemocapnia gen. nov.

Body and wings slender, radius not bent at origin of radial sector, no oblique cross-vein beyond end of subcosta, rest similar to *Arsapnia;* in hind wings the anal area reaches only a little beyond middle of wing; setae probably short, the joints beyond the first two three much elongate; in type species apparently but seven joints.

Nemocapnia carolina sp. nov.

Figures 1, 2, and 6

Body black, antennae and legs slightly paler, all densely

clothed with long hair, especially long on the legs; fore wings nearly hyaline, slightly gray, veins brown, veins and margin with short hair, membrane with very minute hairs; hind wings similar. Fore wings slender, radius not bent at origin of radial sector, only one or two costal cross-veins and these near tip; no cross-vein beyond end of subcosta, none of apical veins forked, and all subparallel. Hind wings with subcosta ending before middle of wing, lower branch of medius with a long fork.

Pronotum a little broader than long, sides parallel. Setae with seven joints (possibly have been more), all but the basal two elongate, longer than in related forms.

The male has the long median piece (in the only male) projecting behind, but probably normally recurved.

Fore wing 6 mm. long.

From Morgantown, N. Car. (Morrison), mixed in with specimens returned from a loan as "Leuctra spp.". Type M.C.Z. No. 22662.

ORDER NEUROPTERA

Family Chrysopidae

Abachrysa gen. nov.

Body broad and heavy; antennae close together at base, not as long as wings; pronotum about twice as broad as long; fore wings with divisory cell much as in *Nodita,* six cubital cross-veins beyond it; costal area only moderately broad; the branches from cubitus to hind margin are in pairs, the two from each cell close together at base, or often united in one stem; the cross-vein from subcosta to radius is nearly as far out as base of divisory cell; the second cubital cell no longer than the first.

In the hind wing there is no trace of the triangle between base of radial sector and the medius, the radial sector, apparently, is here united to the upper median vein.

Genotype, *Chrysopa eureka* Bks.

It differs from *Chrysopa* and many other genera in the broad pronotum, in the short second cubital cell, in the paired branches of cubitus to margin, etc. Besides the type specimen from Arkansas, I have one collected by Prof. Frank Hull at Agricultural College, Miss.

Chrysopa crotchi sp. nov.

Pale green. Face with two black spots each side, one under eye near to clypeus and one at outer side of clypeus; palpi pale, unmarked; antennae wholly pale, the basal joints rather short, antennae much shorter than fore wings; pronotum much broader than long, hardly narrowed in front, unspotted.

Wings moderately long, almost acute at tips. Fore wing with costal area rather narrow, divisory veinlet ends beyond the cross-vein, eight cubital cross-veins beyond it; radial sector but slightly curved, fifteen radial cross-veins; the gradate veinlets in even and nearly parallel series and parallel to outer margin, about ten in each row, post-cubital area nearly twice as wide as cubital; veins greenish, most of the costals marked with black toward base, some radials with short dark mark, basal vein from cubitus to anal black, and the gradates dark; hairs on veins short, on costals hardly one-half a cell's width; stigma pale green, not prominent.

In hind wings the costals, radials, and gradates also partly dark, eight cubital cross-veins, fifteen radials.

Length of fore wing 16 mm., width 5.5 mm.

From Victoria, Vancouver Island, July (Crotch). Type, M.C.Z. No. 22975.

ORDER TRICHOPTERA

Family Limnephilidae

Dicosmoecus obscuripennis sp. nov.

Figures 4 and 5

Face yellowish, vertex black, both with black hair; antennæ brown, black on basal joint; palpi brown, paler on base; thorax black, pro- and mesonotum with yellowish hair; abdomen dark brown; legs brown, rather paler toward tips, spurs brown, spines black. Fore wings uniform brown (darker than in *D. tristis*), dot in base of fork two only distinct darker mark, veins yellowish, hairs mostly erect and black; hind wings paler brown, almost yellowish toward base.

Fore wings a little broader than in *D. tristis;* venation of both pairs practically the same as in *D. tristis.*

The male genitalia have the lower appendages widely outspread, the apical part about as slender as in *D. tristis* and with a sharp point; the superior appendages are much smaller than in *D. tristis*, slender, cylindric, scarcely clavate, while in *D. tristis* they are fully twice as broad and flattened and near tip roundedly widened.

Fore wing 19 mm. long, 7 mm. wide.

From Alaska. Type M.C.Z. No. 22658.

Family Leptoceridae

Arthripsodes slossonae sp. nov.

Figure 7

Body yellowish brown; antennae dark, each joint pale on base; hair on head mostly pale, but a large tuft of dark hair each side in front of eye and below antenna, and some dark on posterior warts, thoracic notum mostly with pale hair, some dark near sides; legs pale; front legs of male with the tibiae dark on inner sides, and also the tips of tarsal joints dark. Fore wings a nearly uniform yellowish brown; a snow white mark at the end of anal vein, one at base of the stigma, and faintly over end of discal cell; hind wings gray, unmarked.

In fore wings the median cell does not reach nearly as far basally as the discal cell (more subequal in *transversus*).

The male genitalia has the clasper much as in *A. transversus*, the apical segment a little shorter, but the curved appendage is here very much shorter and stouter toward base; in length but little, if any, more than one half of the apical segment; each side of the base of the penis is a lobe fringed with stout bristles (not in *A. transversus*).

Length of fore wing 10 mm.

From Bellaire, Florida (Slosson) and Harrisburg, Pa., 13 July (Champlain). Type M.C.Z. No. 22655.

Family Hydrophychidae

Hydropsyche carolina sp. nov.

Figure 8, 9

A small species with the penis of the *depravata* type. Head and thorax dark, head with white hair, thorax in front

with pale yellowish hair; antennae pale, obliquely dark on joints as usual; palpi a little brownish; legs very pale, rather brown on tarsi, hind tibiae with long white hair, spurs pale; abdomen dark brown above, paler beneath, a white lateral stripe where dorsum and venter meet.

Fore wings mostly clothed with brown hair, dark at stigma and toward tip, a curved row of white spots, often united in a band, across the apical cells, a whitish spot before the stigma, an elongate white spot somewhat before outer angle, not extending upward beyond median vein, and a little before it is another white spot, sometimes the two nearly connected.

The male genitalia have an angular incision in the superior plate, the apical part of clasper is slender and curved; the penis, seen from side, is enlarged at tip, mostly on lower side.

Fore wings 7 mm. long.

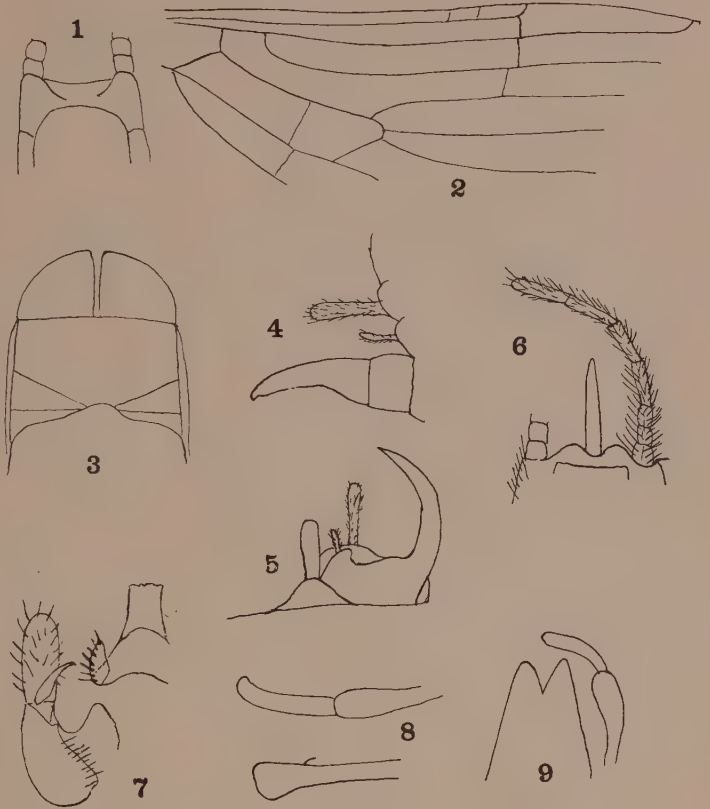
From North Carolina (no further locality). Type M.C.Z. No. 22657.

Of the size of *H. phalerata*, it is readily separated by the differently marked wings, and by the very different genitalia.

Explanation of Plate XI

1, *Nemocapnia carolina*, ventral plate; 2, *Nemocapnia carolina*, fore wing; 3, *Isocapnia fumosa*, ventral plate; 4, *Dicosmœcus obsuripennis*, genitalia, side; 5, *Dicosmœcus obsuripennis*, genitalia, below; 6, *Nemocapnia carolina*, male venter, below; 7, *Arthripsodes slossonæ*, genitalia, below; 8, *Hydropsyche carolina*, clasper and penis; 9, *Hydropsyche carolina*, superior plate, above.

Psyche, 1938 Vol. 45, Plate XI.



Banks — New Neuropteroid Insects

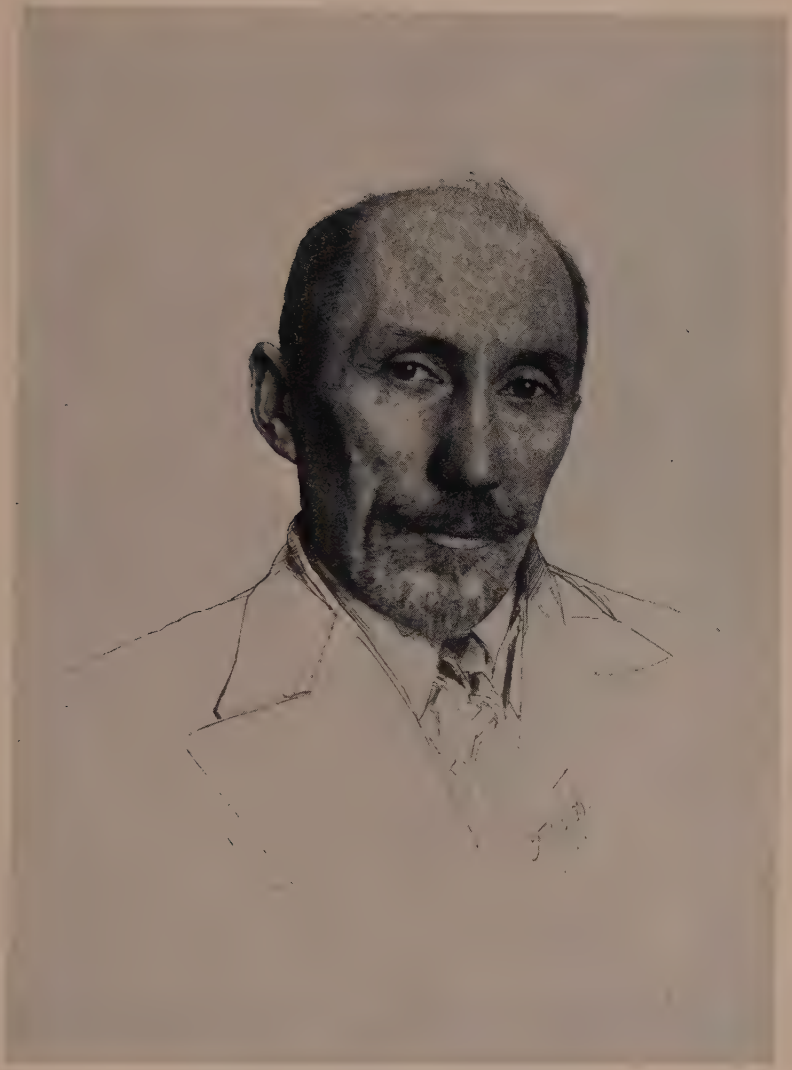
ANDREAS VASSILIEVITCH MARTYNOV

Dr. A. V. Martynov, the distinguished Russian entomologist, died from cancer on the twenty-ninth of last January. Born at Riazan, Russia, August 9, 1879, he graduated from Moscow University in 1902 and continued there with his graduate studies. In 1908 he was appointed to the faculty of the University of Warsaw, and in 1915 moved with the University to Rostoff. Six years later he was placed at the head of the department of Neuroptera and Trichoptera at the Zoological Museum of the Academy of Sciences, in Leningrad. During this period he became interested in fossil insects and in 1936 was appointed Senior Specialist in the Department of Insecta, at the Palaeontological Institute of the Academy, in Moscow, a position which he held up to the time of his death.

Although Dr. Martynov was primarily an entomologist, he was also interested in Crustacea (Gammaridae), on which he published fifteen taxonomic papers. In addition to compiling four text-books on insects, Dr. Martynov's entomological researches were concerned with the taxonomy of the Trichoptera, general morphology, and paleoentomology. His publications on Trichoptera were almost exclusively confined to the Asiatic fauna, and he greatly extended our knowledge of the caddis-flies of that continent. His Trichopterous papers, totaling twenty-five, include approximately 1500 pages.

The studies on insect morphology dealt mainly with the wings and their venation. Of the numerous papers which he published on these structures, two are especially important —*Uber zwei Grundtypen der Flügel bei den Insekten und ihre Evolution* (1925) and *The Interpretation of the Wing Venation and Tracheation of the Odonata and Agnatha* (1924)[1]. The conclusions which he independently reached

[1]Because of the great importance of this paper, which was printed in Russian, an English translation of it was published by the writer in Psyche, vol. 37, pp. 245-280.



Andreas Vassilievitch Martynov

in the latter paper paralleled those just previously arrived at by Lameere (1922).

It was by the researches on fossil insects, however, that Dr. Martynov made his greatest contributions to entomology. The forty papers which he published on paleoentomology contain very nearly a thousand pages. His early work on fossil insects (1925-1927) dealt with a very remarkable series of Jurassic fossils from Turkestan. In 1928, however, before he had completed his studies on these, he became interested in Permian insects and devoted most of the next ten years to them. When he began these investigations only thirteen species were known from the Permian of Russia; at the present time, almost entirely as a result of Dr. Martynov's studies and field work, the number of such species has exceeded three hundred. Their significance is apparent when we consider that they are almost the only Permian insects known, apart from those described from Kansas and Australia. The Russian Permian fauna thus fills in what would otherwise be a very disconcerting gap in our record of the Permian insects.

Although I have had a regular correspondence with Dr. Martynov for the past twelve years, since he started work on fossil insects, I did not have the opportunity to meet him, and I am consequently unable to add to this account any intimately personal details of his life. Mrs. Martynov kindly sent me the accompanying picture, which was made in 1929, while Dr. Martynov was at the Zoological Museum in Leningrad.

F. M. CARPENTER.

DYTISCUS HABILIS SAY IN TEXAS

In the Schaeffer collection of Dytiscus, which was recently presented to the Museum of Comparative Zoölogy through the kindness of Mr. Kenneth W. Cooper, were two male specimens of *Dytiscus habilis* Say from Alpine, Texas, dated June 2. This Mexican species seems not to have been recorded before north of the border. It is close to *C. marginicollis* Lec. but is smaller (24 to 26 mm. long), more evenly oval, with prothorax even more broadly margined with yellow in front and behind. These two Texan specimens have been compared with four from Mexico in the M.C.Z.

P. J. DARLINGTON, JR.

LOXANDRUS INFIMUS BATES IN TEXAS

Of *Loxandrus infimus* Bates, previously known only from Mexico and Central America, I took a series at Brownsville, Texas, June 11-16, 1933, at light and in cracks in dried mud on the edge of a pond. Dr. Fritz van Emden has kindly compared two of my specimens with Bates' types in the British Museum. This species differs from all other Loxandrus found north of Mexico in being dull and not iridescent, with distinct alutaceous microsculpture on the elytra.

P. J. DARLINGTON, JR.

PIN-LABELS IN MULTIPLES OF 1000, ALIKE

One Dollar Per Thousand

Smallest Type. Pure White Ledger Paper. Not over 4 Lines nor 30 Characters (13 to a line) Additional Characters, 3 cents each, in total and per line, per 1000. Trimmed so one cut makes a label.

C. V. BLACKBURN, 7 Emerson St., STONEHAM 80, MASS.

CAMBRIDGE ENTOMOLOGICAL CLUB

A regular meeting of the Club is held on the second Tuesday of each month (July, August and September excepted) at 7.45 p.m. in Room B-455, Biological Laboratories of Harvard University, Divinity Ave., Cambridge. Entomologists visiting Boston are cordially invited to attend.

WARD'S ENTOMOLOGICAL SERVICES

Entomological Supplies and Equipment

Carefully designed by professional entomologists. Material of high quality at low prices. **Send for Supply Catalog No. 348.**

Insect Preparations

Life Histories, Type Collections, Collections of Economic Insects and Biological Insect Collections. All specimens are accurately determined.

Insects for the Pest Collection

We have in stock over three hundred species of North American Insect Pests. **Send for Price List No. 349.**

Ward's Entomological Bulletin

A monthly publication sent free to all entomologists requesting it.

Information for the Beginner

Send for **"Directions for Collecting and Preserving Insects"** by Dr. A. B. Klots. A mine of useful information. Price 15 cents.

WARD'S NATURAL SCIENCE ESTABLISHMENT, Inc.

P. O. Box 24, Beechwood Station

Rochester, N. Y., U. S. A.

The Frank A. Ward Foundation of Natural Science of the University of Rochester

BACK VOLUMES OF PSYCHE

The Cambridge Entomological Club is able to offer for sale the following volumes of Psyche. Those not mentioned are entirely out of print.

Volumes 2, 3, 4, 5, 6, 7, 8, 9, 10; each covering a period of three years, $5.00 each.

Volumes 12, 14, 17, each covering a single year, $1.00 each.

Volumes 18, 19, 20, 21, 22, 23, 24, 25, 26, each covering a single year, $1.50 each.

Volumes 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, each covering a single year, $2.00.

Orders for 2 or more volumes subject to a discount of 10%.

Orders for 10 or more volumes subject to a discount of 20%.

A set of all the volumes available (40 in all) will be sold for $79.00.

All orders should be addressed to

F. M. CARPENTER, Associate Editor of Psyche,
Biological Laboratories,
Harvard University,
Cambridge, Mass.